ISASC

EQUILIBRIUM®

QUARTERLY MAGAZINE OF THE INTERNATIONAL SOCIETY OF ANTIQUE SCALE COLLECTORS

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PAGE 966

Courtesy Sotheby's, Bond St, London.

Cover Picture

In the 1770s, there was a great upheaval in the Royal Mint when most of the old worn gold coins, and most of the foreign gold coins circulating in England, were withdrawn and made into new guineas and half-guineas. Apparently, it was thought to be a good time to make a new set of Standards for use at the Mint. This unique set (shown on the front cover) consists of ten knobbed brass cylindrical weights engraved 500, 300, 200, 50, 30, 20, 10, 5, and 2 guineas. There are also, in a velvet-lined lidded compartment, three flat round uniface weights engraved 1, ½, and ¼ guinea; and nine recesses for square weights. The largest recess is about the size of a 100 grain weight, while the smallest is the size of a 1 grain weight. Inside the compartment is a second small lidded compartment containing a single round recess. The diameter is similar to the recess for the guinea weight, but only half the depth. Its purpose is not known, but its special housing infers importance. The mass of the knobbed weights (e.g. 10 gua = 83.97g; 1 gua = 8.39g) shows that they were made for guineas of full weight (a new guinea was 8.38g) while the smaller weights could be used for determining the bullion value of old worn coins returned to the Mint for recoining.

The weights are housed in a mahogany chest with two folding brass handles and three locks with decorated keys each of a different ward configuration. A brass plate on top of the lid is engraved:-

STANDARD WEIGHTS for GOLD-COIN

made According to Act of Parliament
1774

FOR HIS MAJESTY'S MINT

Robert Pigot Esq^{r}*...............Warden*
Hon^{ble} *Charles Sloane Cadogan Esq*^{r}*.Master*
John Buller Esq^{r}*...........Comptroller*
Joseph Lucas Esq^{r}*....Kings Assay Master*

INTERNATIONAL SOCIETY OF ANTIQUE SCALE COLLECTORS
Founded September, 1976
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Photograph Coin Weights

MICHAEL CRAWFORTH

Recording all the fine detail on coin weights is a very satisfying form of photography. Basically, all you need are close-up facilities for your camera and a handy table near a sunny window. The techniques required are different from the usual holiday 'snaps' and portraits, but they are not difficult.

LIGHTING

The lighting required is very simple, but vitally important if all the details of letters, numerals and monarch's head are to show clearly. Unlike everyday photography, it is best for coin weights if the surroundings are relatively dark, so take the photographs indoors on a table near a window (see Back Lighting, EQM p.366). The light needs to be at a low angle when the sun is low in the sky, so that long shadows are formed. Well-worn weights are best shown with an angle of about twenty degrees from the horizontal, Fig 3. Clearly defined detail (like new shiny coins) shows best at a larger angle, up to about forty degrees. Experiment by tilting each weight until all the details show clearly when looking through the camera viewfinder. If necessary, use some small object, or modelling clay under one edge of the weight to obtain the best angle. Avoid bright reflections from the surface of polished weights.

The low angle of the sun's rays provides the 'long' shadows which reveal all the details. Unfortunately, it also gives an undesirable heavy shadow behind the weight, which spoils the photograph, Fig 4, but this problem can be overcome.

The unwanted shadow can easily be avoided by using a small piece of glass or clear plastic sheet. A piece about 150mm square (6" sq) is ideal. Place a piece of white or coloured paper on the table. Then use two books, or two other articles of equal height, to position the glass about 30mm (1¼") above the paper. Place the weight in the centre of the glass and you will

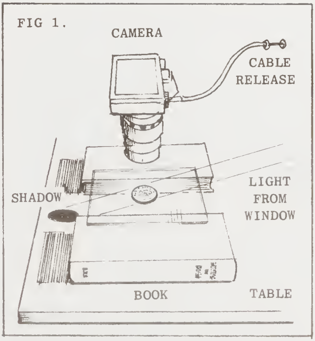


FIG 1.

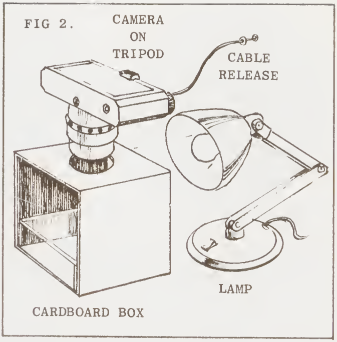


FIG 2.

find that the shadow of the weight is projected on to the paper some centimetres away, out of sight of the camera, Fig 1. Of course, you must position the books so that their shadows, too, cannot be seen. Having set up the lighting, you can adjust the camera for correct exposure and take the shot.

If you want to photograph a few weights, occasionally, the above method is very satisfactory. If you have many to do - for your collection catalogue; for insurance records; for an article - it is worth making an apparatus which uses artificial light. My first apparatus was made from thick black card, but wood or plastic would be stronger. It consists of a square box about 150 x 150 x 150mm (6"x 6"x 6"), open at the front and rear. Inside the box, the bottom is white, but all other surfaces are matt black (the basic colour of the card). Two strips of card are fixed along the sides of the box to locate the piece of plastic sheet about 30mm (1¼") above the bottom of the box, Fig 2. A hole in the top of the box, the same diameter as the camera lens, provides the viewpoint for the camera. Lighting is provided by an ordinary domestic lamp with an adjustable arm (a 40W or 60W bulb is adequate). The flexible arm allows adjustment of the angle of light to make the details of the weight show clearly in the viewfinder. Now that

the light source is controllable, you will not need to tilt the weight or wait for the sun. Also, if you always set the lamp at the same measured distance from the weight, the camera settings will always be the same.

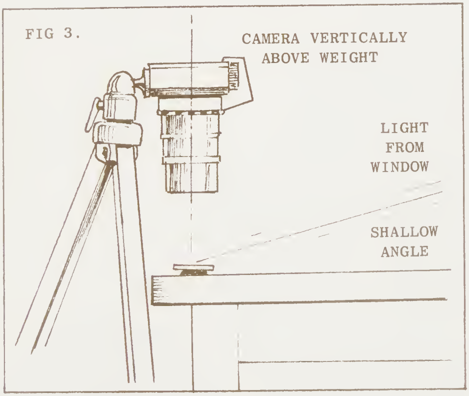


FIG 3.

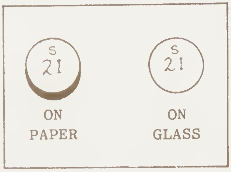
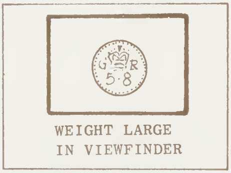


FIG 4.

FIG 5.


Alternatively, if you are a handy-man, you can make a self-contained apparatus with its own light source. My second apparatus was made from black acrylic sheet, Fig 6.

Whatever arrangement you use, best results will be obtained with the camera vertically above the weight, and very close up so that the weight is large in the frame of the viewfinder, Fig 5. ALWAYS use a tripod and cable release.

CAMERA

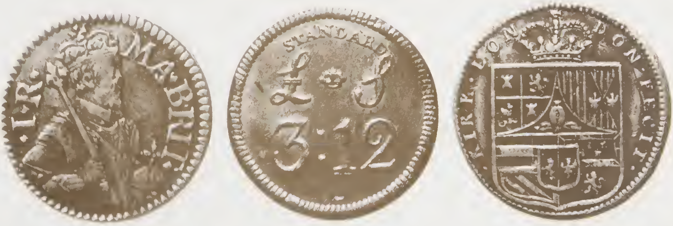
It is essential to use a single-lens reflex camera with an interchangeable lens, in order to see exactly what you are photographing at very close range. You will need a supplementary lens, or a set of extension tubes, or a macro lens. A supplementary lens is the cheapest, and it simply screws onto the front of your standard lens, but the quality is not as good as the more expensive tubes or macro lens. Extension tubes are fitted between the camera body and the standard camera lens. If possible, get automatic tubes which operate the aperture in the normal way. If you can only get non-automatic tubes then you will have to remember to open the aperture manually, when composing the shot, and then close it before pressing the cable release.

A typical set of extension tubes consists of three tubes 12, 20 and 36mm long, which can be used individually or in any combination. The shortest will approximately halve the normal minimum range of your lens. All the tubes together will bring the front of your lens to within about 25mm (1") of the object. Various other combinations of the tubes will give intermediate ranges.

One important thing to remember is that using extension tubes cuts down the amount of light reaching the film, so you must compensate by opening the camera aperture, or reducing the speed. The instructions for the extension tubes will give the correction required for all combinations. If you have through-the-lens metering (as most modern SLR cameras have) the compensation will be automatic.

A macro lens is the most expensive solution, but it has a remarkable flexibility in its range which will cope with all sizes of object from coin weights to complete landscapes, with no fiddling around with extension tubes, exposure correction, or supplementary lenses. You simply fit it in place of your standard lens (which you will not need again) and use it in the same way as a standard lens.

When you take close-up shots with any of the above systems, the focussing range (depth of field) is very small, so take extra care. Use a small aperture, F8 or F11, and adjust to the required exposure by changing the shutter speed. If your camera is fully automatic, and you cannot over-ride the system, use the brightest lamp you can to ensure a small aperture.



Any well-known single lens reflex (SLR) camera will do the job satisfactorily. I happen to use an Asahi Pentax MX with extension tubes. With my apparatus, using a 40W domestic bulb set 180mm (7") from the weight, the standard exposure is ½ second at F11, for black-and-white film rated at 125 ASA.

FILM

The best results will be obtained using a relatively slow speed film. For black-and-white I use Ilford FP4 rated at 125 ASA. For colour transparencies, I suggest Ektachrome 160 which is for use with tungsten filament lamps. For colour prints use Kodacolor Gold 100 with daylight, but for tungsten filament domestic lamps, this film needs a blue filter, Wratten 80A, which corrects the colour balance.

PRINTS

Good photographs can be spoiled by poor printing. If you have taken good negatives, but the results obtained from standard shop printing are inadequate, ask for the more expensive 'custom' printing, where each frame is assessed individually before printing.

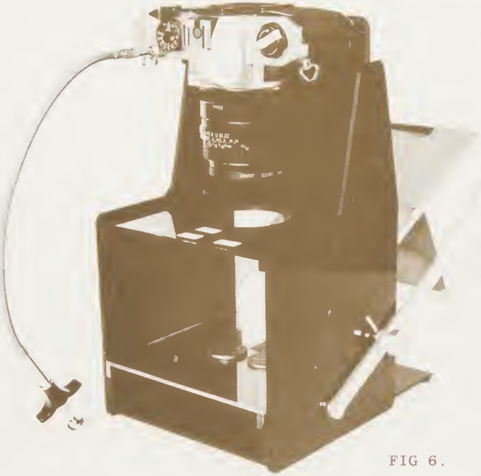


FIG 6.

What will happen to my Collection?

A question which is raised over and over again in conversation with ISASC members (and other collectors) is 'what shall I do with my collection when I die? After long and exciting searches for scales and weights, after the delights of success, and the compilation of a collection, after finding out about the nature of the scales and their history, it is hard for the collector to realise that only a few other people share his enthusiasm. He does not want to contemplate the sale and dispersal of his prize possessions to destinations all over the world, nor to see rare and unusual items, part of his country's heritage, become toys on some executive desk. What, then, are the alternatives?

Donation to a museum is the first alternative to selling that comes to mind, but anyone who has visited museums to look at the weights and measures departments will know that very few items are put on display. The staff know very little about the subject, the store rooms are already over-full, scales and weights become separated from their boxes, and their condition slowly deteriorates through neglect born of lack of interest and shortage of staff. Virtually no museum will accept a bequest if there is a condition that the collection, or even a part of it, must be put on display.

Another solution sometimes suggested is the creation of an ISASC museum. Where could such a museum be established? Would any American collector want to send prize American scales and weights to a museum in, say, Germany? Would a German collector want to send rare national items to a museum in England? I think not - I know I would not want unique British items to go abroad, even if it was to an ISASC-run museum. In any case, the enormous sums of money required to set-up, insure and maintain a museum and its staff make this solution untenable, unless we have a generous multi-millionaire sympathetic to our cause.

Clearly, there are major disadvantages to these possible solutions. All we can do is set down the advantages and disadvantages and let each collector make his own decision:-

SELL THE COLLECTION BY AUCTION

1. Your scales and weights are likely to go to other collectors who will derive great pleasure from them, as you have done.
2. The items are likely to be well looked after by an enthusiast.
3. You will have no control over where the things go, so they may be dispersed all over the world.
4. Your country's heritage may be lost for ever.

DONATE THE COLLECTION TO A MUSEUM

1. Your scales and weights will be retained in your country.
2. Some of them may be put on display.
3. The collection may be known under your name.
4. Most of the items will end up in store.
5. The items may be allowed to deteriorate.
6. Access to your collection by other enthusiasts may be severely restricted.

ESTABLISH A MUSEUM

1. Much of the collection could be on display.
2. They could be properly displayed and well labelled.
3. An enormous sum of money would be required.
4. It is almost certain that a museum would be required for each nation.
5. Public interest would probably be small.

My own solution to the problem is to accept that my collection will have to be split up, eventually. So, I have arranged that the unique and rare items which I know are not in Britain's museums now, will be donated to a British museum. The rest of the collection, perhaps 80 per cent, will be available for my wife or children to sell or keep, as they wish. In this way, I hope to preserve items important for Britain's heritage, and keep them in my country. At the same time other people may be given the opportunity to enjoy owning the many other items.

MICHAEL CRAWFORTH

Scales Sales & Scrap

ALBERT RANGELEY

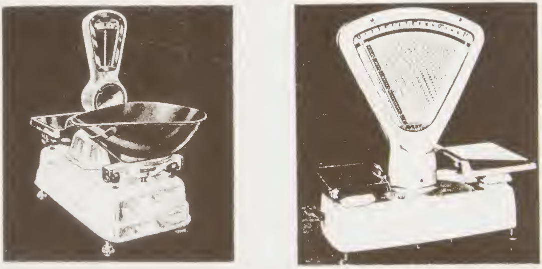
The reminiscences of John Lound and Bob Holdaway portraying the activities of a former weighing machine mechanic (EQM pp.7-9, 137-38) and a retired Weights and Measures inspector (EQM pp.711-16), revived memories of my days as a weighing and testing machine representative during the period 1950 to 1972. I offer a day in my life during the early sixties to show another facet of commercial and industrial weighing:-

Almost all commercial and industrial enterprises use a weighing machine of some kind, as do all the food shops. It might be a scale in a factory for an industrial process or for weighing the final product for trade purposes; it might be a scale in an office used for postal purposes; it might be scales in a mine for ascertaining the output; scales in the hardware business for weighing nails or putty, and so on, ad infinitum. I found that, in the post-war era, the majority of sales were replacements for old scales, but some were sold to new shops and factories, or their extensions.

The aim of the salesman, therefore, was to offer a product that had an advantage over the machine currently in use. The advantage could be faster operation, thus saving time and labour costs with a consequent increase in production. For example, a dial platform machine could replace a steelyard platform scale, or a portable automatic grain weigher could replace a wooden sack 'deadweight' scale. Alternatively, the advantage could be more accurate weighing almost eliminating overweight. For example, a semi-self indicating machine with fine divisions for repetition weighing, instead of a fully self-indicating machine with coarser divisions, or a dial scale instead of a counter scale with loose weights for the weighing of potatoes. In lots of cases, the advantages were twofold - speed and accuracy.

With this objective in mind, three hundred sales representatives, of the Company that devoted more space to the manufacture of weighing machines than any other company in the World, started out each morning with their vehicles full of various scales.

With the recent introduction of a new, purpose designed, self-levelling, semi-self-indicating, price-computing scale for mobile shops, market stalls, butchers' vans, and so on, I started out one day to look for orders from the country butchers who served the surrounding villages, selling from the rear of their vans. One such call found the butcher in the small slaughterhouse at the back of his shop. Such village slaughterhouses proliferated before the introduction of hygiene laws in the nineteen-fifties. When I announced the purpose of my visit I was told that it would be necessary to talk while he worked. I hurried to my car, adrenalin flowing, excited that I had found a prospective customer who was willing to listen without much persuasion. When I returned with the scale, a beast had been led into the slaughterhouse with a rope around its neck. The rope was fed through a ring cemented into the floor and then attached to a pulley block. The beast was drawn into a suitable position and when it had calmed down, I had to endure witnessing the operation of the 'humane killer', the bleeding, the hoisting of the beast by the pulley block, the disgorging of the offal, and blood splashing on my shoes. No comment emerged from the butcher, who, with his pipe in his mouth, listened silently while I, with a pretence of nonchalance, presented my case. After about fifteen minutes, the butcher stood back, placed his knife on the block, wiped his gory hands on his apron and said laconically "I'll have it, lad".



Left: Avery 1102. Semi-self-indicating scale, 20 lb capacity, roberval and spring resistant, as used by the butcher. Right: Avery 1215. Price-computing semi-automatic scale, 14 lb, inverted roberval and spring.

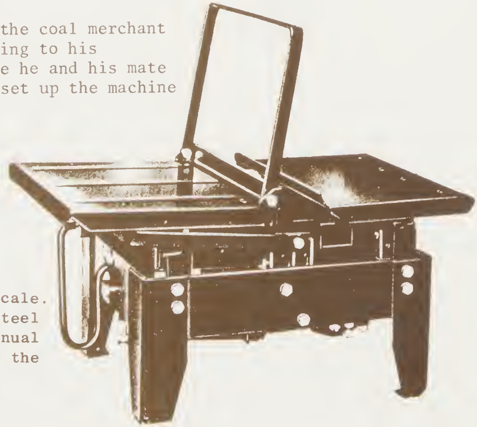
Before the country railways were cut by Dr.Beeching, hundreds of stations used to have a coal staithe* for the local merchant, who, very often, was the stationmaster himself or a nearby farmer. As I was carrying out a campaign in the country, my demonstration scales included a scoop coal scale. Machines of this type had been manufactured for many decades, but this particular type was a new development. The basic single lever machine with proportional weights had been modified by the addition of an indicating 'headwork' which comprised a needle and chart with an ungraduated 'light' portion, a central zero mark, and a graduated 'heavy' portion of 5 lb x 8 oz divisions. The 'light' portion was ungraduated to conform with the Weights and Measures Regulations appertaining to weighing which could take place 'in the presence of the purchaser'. Graduated 'light and heavy' charts were forbidden under such circumstances.

My next call was on the coal merchant in the same village, who used an ordinary portable 'deadweight' machine of the type which had to be carried on the wagon in case a customer wanted to check the weight of his purchase. The scale was often the subject of a 'spot check' when the merchant was on his rounds. The Weights and Measures inspector would test the scale to see that it was within the permitted limits, and then would carry out a random check on some of the load.

** Staithe - a chute for loading coal into waggons or ships.*

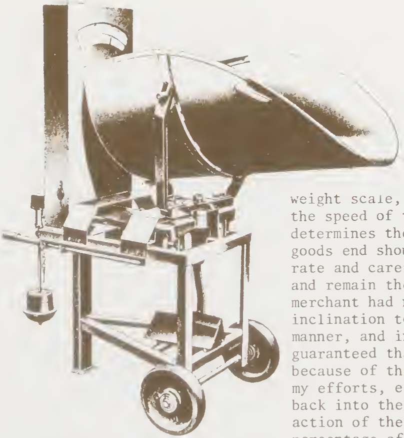
The method of weighing in the coalyard was to fold an empty 1 cwt sack under two 56 lb weights, on the weight plate, and then place on the goods end, partially filled sacks of coal. The merchant would then fill up the sack from the stockpile which comprised several grades that were separately stored within brick bunkers. The disadvantage of this method was that the sacks varied, some being new, some old, some wet, and some dry. The variation in weight could be as much as 3 lb. In addition to this, the operation required two pairs of hands, one to hold open the sack and the other to fill it. If a new wet sack had been used as tare weight, then almost all of the wagon load would be considerably overweight. This often occurred at the city loading wharves - a merchant would be charged for the total load weighed on the road weighbridge of, say, 8 tons 3 cwt 1 qtr, when, in fact, he had loaded in theory 160 bags of 1 cwt each, a total of 8 tons. However, if a dry light sack was used, then the bags would be considerably underweight and this would subject the merchant to severe penalties if discovered by the Inspector during 'spot checks'. It was in the merchant's best interest, therefore, to protect his profits and his reputation, because newspaper publicity in connection with a short weight prosecution could adversely affect his business. The saleman's object, therefore, was to offer a machine that would weigh 'nett' weight so that the difference in sack weights could be discounted.

My usual approach was to ask the coal merchant if I could demonstrate something to his financial advantage, and while he and his mate carried on weighing, I would set up the machine ready for use.



Avery 3706. Deadweight coal scale. capacity 2 cwt. Mazak beam, steel frame, folding sack guard, manual locking mechanism, as used by the coal merchant.

In this particular case, the merchant in the village had already pre-weighed several tons of sacks and these were ready to be loaded on to his wagon. After asking permission to proceed, I took off my jacket and carefully folded it up and laid it on my car seat. I rolled up my sleeves and with the strength of a 'man possessed' I proceeded to empty the weighed sacks into the scoop of the scale, one by one. After each check, I made a note of the amount of the inevitable overweight and threw the surplus coal back on to the stockpile in a theatrical manner. (When using an accelerating dead-



Avery 3708. Single-lever scoop scale. Capacity 2 cwt graduated 5lb x 8oz above zero, ungraduated below, as sold to the coal merchant.

weight scale, as used by this merchant, the speed of the fall of the beam determines the weight. To be exact, the goods end should fall at a very slow rate and carefully settle on the stop and remain there. When weighing, the merchant had neither the time not the inclination to weigh in this careful manner, and in practise, it could be guaranteed that overweight occurred, because of the speed of the fall). After my efforts, each corrected load was put back into the sack by using the tipping action of the scoop. By calculating the percentage of the total overweight against loads checked, and then presenting this as a percentage of his annual turnover, I proved that he could make a saving that would pay back his expenditure within a matter of months. The scale would thus cost nothing, and future years would bring more profit.

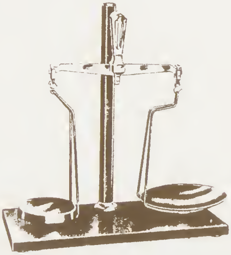
As this client had a slight cash-flow problem (as we say in today's idiom), I found it necessary to offer hire purchase facilities in order to obtain his order, having proved the viability of the proposal. The offer of a free money box in which to place his daily saving finally secured his order and I left once again, happily.

My next call was to sign a contract for maintenance on a scale on which the guarantee and free maintenance period was about to expire. It was always politic to call before expiry to create continuity, and the majority of customers were quite amenable to this. The Company always regarded contracts as its life blood. It ensured regular income for them, it enabled the labour force to carry out an all-year-round planned programme and it ensured that when a scale required attention, we were the first to know. The customer benefitted by the quarterly visit when the fitter adjusted the scale to better-than the limits required by Weights and Measures regulations. Provision of the main working parts was included along with a 'loan scale' if it was necessary to take the scale to our workshops for repair.

After collecting payment for an outstanding account from another nearby business, it was time to break for lunch. Account collection was relatively easy if the right approach was made. Mine was usually a cheerful 'Hello Mr. So-and-So, I've brought along your statement - I'll take the cash in for you to save postal and cheque charges'.

I returned to the local branch workshop for lunch, which usually consisted of a sandwich and a mug of tea with the foreman and his staff - no fancy expense accounts for our representatives. This hourly break usually consisted of a mutual aid discussion - the mechanics reported interested clients who they encountered on their rounds.

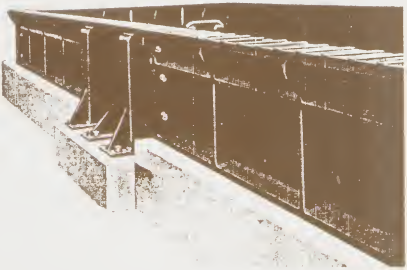
This day, one of the younger mechanics gave me the name of one of the local pharmaceutical chemists who was interested in replacing his beam scale because he thought it was nearing the end of its useful life. He had been experiencing a little trouble, the scale only just passing the Inspector's examination a few weeks before. After lunch, the foreman arranged for the assembly of a new 2 lb capacity beam scale for me to take to demonstrate. The latest model had stainless steel cranks, goods pan and weight plate. Under the weight end was a balance box. The beam was made of mazak (a zinc alloy) and painted black. The pillar was constructed from hexagonal hollow steel plate with a high gloss black finish and capped by a stainless steel button. The gallows were diecast and chromium-plated, as were the shackles, and the baseboard was of black plastic laminated construction with a high gloss.



Avery 2027. Pharmaceutical balance capacity 2lb, mazak beam, other parts stainless steel, plastic laminated base, as demonstrated to the pharmacist.

I praised the virtues of this scale, pointing out the hygienic features - the base which just required a wipe with a cloth - the stainless steel which would not corrode and lose weight, and which did not require cleaning. The technical advantages were, of course, enormous - the balancing facility which required no filing of the pans to obtain a balance. Compare this with his old beam scale with the dirty absorbent mahogany base bearing chemical stains, fittings that required cleaning, and variation in balance caused by over-cleaning of the goods pan. (In retrospect, the only comment worthy of that new scale, thinking of our collector members, is 'Ugh'). I did not convert this call to an order, but I left with the promise that one would be given if I called back in two months time - doubtless, just before the Inspector was due to call again! I looked forward to the time when I could bend the brass beam into a horseshoe shape and throw it with the rest of the brass components into the non-ferous scrap box. We used to obtain the princely sum of 6d (2½p) per pound weight from the scrapyard. The mahogany base would help to fuel the workshop stove. Sacrilege you may cry, but today your prize beam scales are rare and valuable because of our Company's scrap policy.

A telephone call from the Area office advised me that an enquiry had been received from the Smithfield Show for a pig weigher. The enquirer was a Sir Thomas Nussey, Baronet, of Tanfield Hall, who maintained a farm and bred bacon pigs. I drove down the mile-long drive which was bound by iron railings, the stately oaks in the pastures providing shade for the cattle, and arrived at the front door. A pull of the bell brought the butler to the door and after stating my business, I was eventually shown into the drawing room where I met Sir Thomas and Lady Nussey. Lady Nussey had a remarkable likeness to Queen Mary - a stately lady, to say the least. During the discussion, afternoon tea was served with the mandatory buttered scones and jam. After an hour of business and general discussion, I left without an order, Sir Thomas having decided to retain his money and make do with his 'approximating scale' - a weigher consisting of a pig pen suspended from a 9 inch diameter spring balance - ugh! Weighing pigs was extremely important, as an optimum range of weight determined the price paid by the bacon factory. The best prices were paid for pigs in the range 180 lb to 200 lb, anything over that weight being considered a fatty pig only qualifying for a lower rate per pound. As a pig approached bacon weight regular weighing had to take place so that pigs at the optimum weight could be sent off to the factory.



Avery weighbridge frame on its foundation wall, man-handled into position using a crowbar, in the knacker's yard.

My final call of the day was in the nature of a social event to ascertain the progress of a fitter and apprentice who were installing a weighbridge that I had sold to a knacker's yard.* The young fitter was carrying out his first weighbridge installation without supervision, in order to gain a higher salary grading. He was squaring-up the 32 ft by 9 ft frame on the foundation walls and I gave him a hand for a minute or two, using my bulk and a crowbar.

On returning home, I was greeted by my wife who looked horrified and disgusted, and I was dispatched to the garage to make a complete change of clothing prior to having a bath. At the knacker's yard, the boiling pans were in 'full cry', the stinking liquid having atomised and dispersed in the air in the form of millions of globules of revolting fluid. While I was aware of the bad odour, as I was when I visited glue factories and tanneries, I was not aware of the full affect on my clothing. I imagine that the fitter and his apprentice, who were both unmarried at that time, both had difficulty finding a girl friend during the week they were installing the weighbridge.

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* *Knacker - a dealer in useless horses who sells their flesh and hides.*

After a bath and meal, I finalised the day's paperwork, completed the daily report on the calls I had made, the orders obtained, and posted the mail so it would arrive at the Area Office the following day.

Such are the vagaries in the life of a weighing machine sales representative.

* * *

Showcase

1. Pendulum letter balance, marked JMAZ Made in Germany, graduated 0-4oz. A screw at the base of the column tilts the scale for zero levelling. Polished stone base.
LOU UIT DEN BOOGAARD COLLECTION
2. Ornately decorated brass roberval letter scale. There is no maker's name or mark.
LOU UIT DEN BOOGAARD COLLECTION
3. Letter balance, pen rack and inkwell mounted on deer's antler. The arc is graduated 0-2oz.
BOB STEIN COLLECTION
4. Roberval letter scales with concealed legs and stays. Weights are 8,4,2, 1,1,½,¼ oz.
LOU UIT DEN BOOGAARD COLLECTION
5. 'Mr.Peanut' American coin-operated person scale which stands about four feet high (1.2m), painted yellow and black. Mr.Peanut is a character used in US advertizing. The coin slot, table of average weights and scale indicator are on top of his hat.
THE RENTZER COLLECTION
6. Spring shop scale with removable scoop. Graduated 0-8lb x 1oz, on both sides. Marked TURNBULL'S PATENT SEP ...1859.
MARVIN MILLER COLLECTION
7. Spring letter balance 'LIBERTY'. Graduated 0-1 lb with postage rates for surface and airmail, parcels.
BOB STEIN COLLECTION
8. Spanish 'fish weights' made of iron and of measured mass, 1040, 462, 233, 121, 61, & 31.5 grams. Each weight is marked R c V.
BILL DONIGER COLLECTION
9. Kitchen scales marked Hushällsväg, graduated 0-2kg and 0-5 lb. White enamelled face and pan.
BILL DONIGER COLLECTION

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SHOWCASE

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SHOWCASE

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Weight Depositing Scale

MICHAEL CRAWFORTH

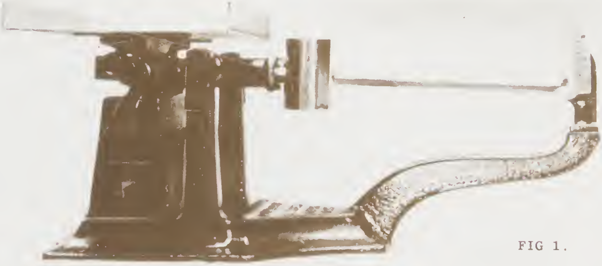


FIG 1.

This most unusual postal scale is based on a rare principle. At first glance, it looks like any other American counter steelyard, but the first clue to something unusual comes when the steelyard blade is examined. It is graduated only in steps of eight: 0,8,16,24,32,40,48 & 56, with no intermediate marks or notches. The next clue comes from the arc attached to the guard which retrains the end of the blade, which is graduated from 1 to 8 starting at the bottom. So, it appears that a coarse setting is obtained by placing the sliding poise at one of the eight-unit steps on the beam, and that the intermediate values are read from the graduated arc. No units of weight are marked on the scale, but by deduction, they must be ounces. Thus, if the sliding poise is set at 32 and the arc reads 5, the indicated weight is 32 + 5 = 37 oz, or 2lb 5oz.

The next question is: How does the inclination range work to give the intermediate readings on the arc ? What gives the progressive resistance to weigh from 1 to 8 oz ? Why do the graduations progress upwards ?

Under the goods plate, and contained inside a large rectangular cast-iron housing, are eight rectangular weights. Each weight rests on a flat bar suspended from the beam underneath the goods plate, Fig 2. When all these weights are resting on the bar, and with the sliding poise at zero, the beam is in equilibrium. When a load is placed on the plate, the plate descends, depositing one of the suspended weights on a stepped platform inside the housing, Fig 2. The plate continues to descend, depositing one weight at a time on the next lowest step, until the load is balanced. Each of the weights deposited represents one ounce, so the total number of ounces is registered on the graduated arc.

The cast-iron base is marked 'AMERICAN MACHINE CO. PHILADELPHIA. PERFECTION POSTAL SCALE. PAT. SEPT 1, 1885' The overall length is 16 inches (410mm).

The author is indebted to Wynona Crossgrove for the photographs.

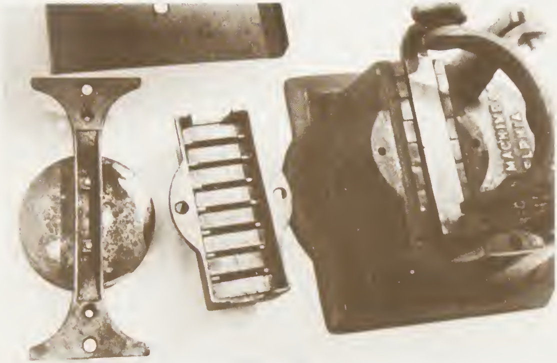
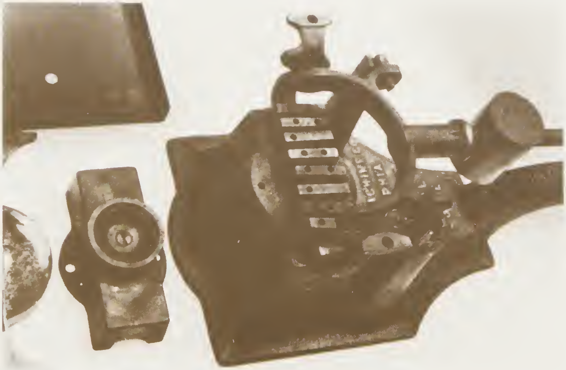


FIG 2. (above) Top: the parcel plate. Left: the support bracket for the plate, with round 'stop' buffer underneath. Centre: the top housing shown upside down revealing the weights in their slots. Right: the main housing showing the bar on which the weights rest suspended in a slot in the stepped platform.

FIG 3. (below) Top: the parcel plate. Left: part of the bracket; the top housing with the round fixed stop. Centre: the main housing with weights in place on the suspension bar. The weights have adjustment holes drilled in them. Sliding poise is visible on the beam, right.



English Coin-Weights 4

NORMAN BIGGS

SQUARE WEIGHTS 1587 - 1632

The year 1526 saw the beginning of a long period of financial instability, involving many alterations and revaluations of the currency. The details are not particularly relevant to our theme, because the production of coin-weights in England was virtually non-existent throughout this period. Of course, we know that merchants involved in foreign trade continued to use scales and weights to check the many different gold coins which circulated in the international markets, as described on page 210 of Barbara Winchester's 'Tudor Family Portrait' (17), for instance. The scales and weights so used were usually made abroad, in Antwerp or Cologne. We also know that during the sixteenth century the continental scalemakers began to produce distinctive wooden boxes specially made for scales and weights. These boxes had square recesses for holding the weights, and naturally enough, the weights themselves were square. Such early square weights can be identified by the fact that they have a blank reverse, but there is no conclusive evidence that any of them were made in England.

With the re-introduction of a sound coinage under Mary and Elizabeth I, it might be expected that rich people in general (as opposed to merchants in particular) would, once again, acquire the habit of weighing coins. Indeed, in 1556 a proclamation was issued (13, p.67) in which people were requested to check their gold coins "by weight, or know by other means the goodness thereof". But the natural reluctance of people to spend money on scales and weights was a great obstacle, and in any case, it was not until 1587 that the authorities took steps to provide suitable scales and weights. In that year, a most important proclamation was published (13, p.539). Among other things, it stated that the Warden of the Mint, Sir Richard Martin, had been ordered to "make ready a sufficient number of upright balances and true weights as well as of every several pieces of gold lawfully current in our realm of England...".

Details of the order to the Warden are given by Lawrence (3). There were to be five different sets on offer, at prices ranging from 3s 6d to 4s 6d. Each set contained fourteen coin-weights as well as grain weights and pennyweights. Lawrence also tells us that a year or so later, the Warden complained that most of the sets had not been sold, but that is not particularly surprising. What is surprising is that not one complete set of scales and weights in the original box has survived, and even the individual weights are extremely rare. Perhaps the best selection of these weights was described over fifty years ago by V.B.Crowther-Beynon (12). The weights are square and have a facsimile of the relevant coin (often the Queen's head) on the obverse; the reverse has a small crown surmounted by the value, in a beaded circle, Fig 1. This reverse type is characteristic of almost all the square weights produced in England from 1587 onwards. The identity of the fourteen coins for which weights were provided in 1587 is in question, but we do know from contemporary accounts that there were many different gold coins in circulation at that time (11, pp.228-9).

When James I became king of England, in 1603, he had already been king of Scotland since 1567 and had developed a deep personal interest in currency matters. His reign was notable for several sweeping changes in the coinage, which can be summarised as follows:

> 1604: The relation between gold and silver was altered; for example, the 20s piece of crown gold (now called the unite) was reduced from $171\frac{63}{67}$ to $154\frac{26}{31}$ grains. Similar adjustments to the fine gold were made in 1606, the angel valued at 10s being reduced from 80 to $71\frac{1}{9}$ grains.
>
> 1611: The value of all gold coins was raised by 10 per cent so that the unite became worth 22s and the angel 11s. Coins with these weights and values were later known as "odd" pieces.
>
> 1619: A new series of coins was introduced, with the weight-to-value ratio fixed in 1611, but having 'even' values. The new 20s crown gold piece (the laurel) weighed $140\frac{20}{41}$ grains, and the new angel weighed $65\frac{5}{11}$ grains.

A few weights for the coins with the 1604-1611 weights and values are known but the majority of square weights are for the 'odd' pieces at their post-1611 values and the new 'even' pieces produced after 1619. The proclamation (14, p.436) authorising the new coinage of 1619 repeated the order of 1587 instructing the Mint to offer scales and weights to the public. Chief officers of cities, boroughs and towns were ordered to obtain weights, and all other weights were expressly forbidden. But once again there was little interest. A proclamation of 1620 (14, p.460) bemoaned the fact that, according to the Master of the Mint, he "hath not any or very few repaired unto him for such balances and weights". (i.e. very few people had bought scales and weights - Ed.) It also repeated the exhortation to weigh coins.

The proclamation of 1620 seems to have convinced many people that coin-weights were desirable, for square weights related to both the odd and even pieces are rather more common thereafter. There are several different types dating from the last years of James I (1620-25) and the early years of Charles I (1625-32). Many of the former are stamped with a crowned I, for Iacubus, the Latin form of James, and most of the latter are stamped with a crowned C. Almost all of them have the characteristic reverse of a crown and the value in a beaded circle. The commonest types have an open crown Figs 2,3 & 4, but there are also types with an arched crown, Fig 5, an arched crown and some fleurs-de-lis in the field, Fig 6, and an arched crown with a small crowned CR in the field, Fig 7, (see also ref.15). The crown on the open crown types is rather larger than that used on the Elizabethan weights, and this feature serves to identify a few rare weights for the old coins of Henry VIII and Elizabeth I issued under James I and having HR or ER in place of the value on the reverse Fig 8.

Another rare type bears the value on the obverse and the words 'without grains' on the reverse, Fig 9. In order to understand the meaning of these words we must return to the proclamation of 1587. It established a 'remedy and abatement' for each current coin, that is, the number of grains by which a coin could lack its full weight and still be accepted at its full value. For example, in 1587 an angel of 10s should have weighed 80 grains; the remedy and abatement for it was fixed at 2 grains, so an angel weighing 78 grains, or more, would pass for 10s. This notion was revived in 1611 at the suggestion of Francis Bacon (16, p.244), and again in 1619. The proclamations imply that a coin-weight should represent the full weight of a coin, and that grain weights should be used to check the remedies and abatements, but clearly there were practical advantages in using coin-weights which represented the least weight at which a coin could pass at its full value. I believe that the 'without grains' weights were intended for this purpose. This interpretation is supported by the existence of a similar weight for the 20s unite of Charles I, bearing the words 'les 3 gr', that being the correct remedy for a 20s piece, Fig 10.

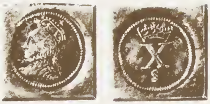
CLASSIFICATION

The weights surveyed in this article Part 4, comprise Group B in the scheme. Five subgroups are distinguished, as follows:

GROUP B	Square weights issued from 1587 to 1632.
Subgroup B1	Elizabethan types, Fig 1.
Subgroup B2	James I 1604 - 1611 types.
Subgroup B3	1612 - 1632 types with open crown on reverse, Figs 2,3,4 & 8.
Subgroup B4	1612 - 1632 types with arched crown on reverse, Figs 5,6 & 7.
Subgroup B5	1612 - 1632 types with legend on reverse, Figs 9 & 10.

REFERENCES (references 1-4 are in Part 1, 5-10 in Part 3)

11. CHALLIS C.E.: 'The Tudor Coinage', Manchester University Press, Manchester, 1978.
12. CROWTHER-BEYNON V.B.: 'Notes on some Unusual Money-Weights' British Numismatic Journal, Vol.21 pp.93-102, 1931-3.
13. HUGHES P.L. & J.F.LARKIN: 'Tudor Royal Proclamations' Vols. II and III, Yale University Press, New Haven & London, 1969.
14. LARKIN J.F. & P.L.HUGHES: 'Stuart Proclamations' Vol.I, Clarendon Press, Oxford, 1973.
15. MALLIS A.G.: 'Notes on English Coin Weights', The Numismatist, Vol.89, pp.1685-1709, 1976.
16. SPEDDING J.: 'The Letters and the Life of Francis Bacon', Vol.IV, Longmans, London, 1868.
17. WINCHESTER B.: 'Tudor Family Portrait', Jonathan Cape, London, 1955.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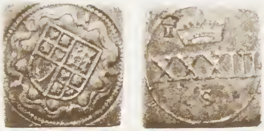
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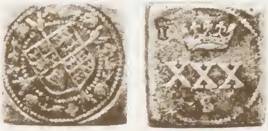
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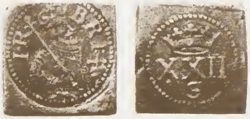
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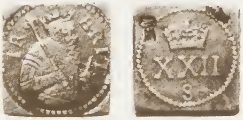
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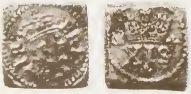
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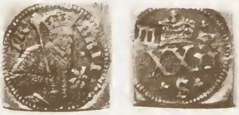
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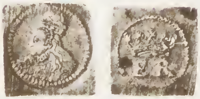
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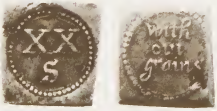

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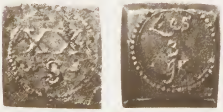
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1. Obv. bust of Queen Elizabeth I. Rev. crown, X, S, in a beaded circle. 86gr, 15mm, c.1587. For the half-sovereign issued 1558 onwards, 87gr, 10s. *(Illustration courtesy George Chmielinski).*

2. Obv. shield in tressure. Rev. open crown, XXXIII s. stamped crown over I. 208gr, 20mm, c.1620. For the rose-ryal issued 1604-19, 213gr fine gold. valued at 33s after 1611.

3. Obv. shield in decorated border. Rev. open crown, XXX s. stamped crown over I. 191gr, 20mm, c.1620. For the rose-ryal issued 1619, 196gr of fine gold, 30s.

4. Obv. figure of James I, I.R. BRI. Rev. open crown, XXII s. 148gr, 19mm, c.1620. For the unite issued 1604-19, 154gr, valued at 22s after 1611.
5. Obv. figure of James I, I.R: BRIT:. Rev. arched crown, XXII s. stamped crown over I. For the unite, as No.4.
6. Obv. bust of James I, I R: BRI:. Rev. arched crown XI s, three fleur-de-lis in field, stamped crown over I, 75gr, 14mm, c.1620. For the half-unite issued 1604-19, 77gr, valued at 11s after 1611.
7. Obv. figure of James I, I R: BRIT. Rev. arched crown, XXII s, with fleur-de-lis and crowned CR in field, stamped 'm' (date letter for 1630) 154gr, 18mm, c.1630. For the unite, as No.4.
8. Obv. bust of Elizabeth I, Rev. crown, E R. 86gr, 16mm, c.1620. For the half-sovereign, as No.1. *(Illustration courtesy the Trustees of the British Museum)*.
9. Obv. XX s. Rev. with out grains, Stamped crown over C. 127gr (has been filed on one edge) 16mm, c.1630. For the laurel of James I and the unite of Charles I, 140gr, 20s.
10. Obv. XX s. Rev. les 3 gr. 135gr, 16mm, c.1630. For the 20s piece, as No.9.

Contemporary Comment

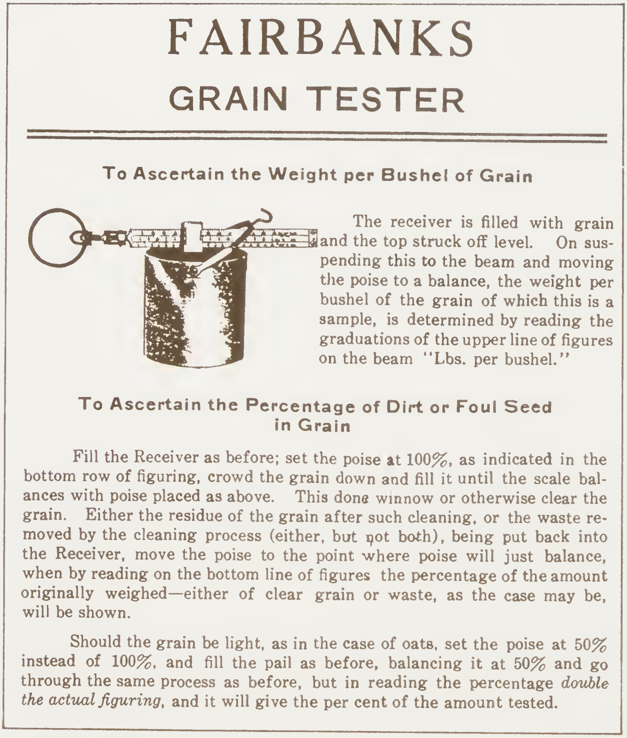
PENCE AND POSTAL WEIGHTS

"The Mechanics Magazine points out that most people are in the habit of carrying postal weights in their pockets. They exist in the pleasant shape of current coins of the realm, and are therefore usually at hand at any and all times. Most people know well enough the precise value of the discs of metal, but very few are acquinted with the precise or theoretical weight of each individual piece of money in circulation. If its weight and value were alike familiarly recognised by the public, the English coinage might easily be forced to do double duty. The bronze penny is universal, and three such coins weigh just an ounce. A letter weighing less than three halfpennies, or half an ounce, must have a penny stamp affixed to it. Five halfpence make one ounce. All our silver coins are safe postal weights. The crown piece is just under the ounce in weight; the half-crown just below the half ounce; and any number of subordinate silver pieces equal in nominal value to those coins is also equal to them in weight. A letter which does not weigh more than a florin and a sixpence, or five sixpences, or ten three-pences, for example, requires a penny stamp only."

This clipping from a newspaper was pasted inside the lid of a coin scale with the label of J.T.Shenstone, 395 Strand, London. Presumably, it was put in by the owner whose signature is handwritten inside the lid: *"Revd. Rd. Shepherd Jany.1841"* The clipping must be from a later date, as it refers to the florin which was first coined in 1849. It shows yet another purpose for which coin scales could be adapted by the owner. Although a letter was too big to lay in the pan, it could be weighed by placing it on edge between the cords and resting on the pan.

Old Advert

Sent in by John Cattle.



FAIRBANKS

GRAIN TESTER

To Ascertain the Weight per Bushel of Grain

The receiver is filled with grain and the top struck off level. On suspending this to the beam and moving the poise to a balance, the weight per bushel of the grain of which this is a sample, is determined by reading the graduations of the upper line of figures on the beam "Lbs. per bushel."

To Ascertain the Percentage of Dirt or Foul Seed in Grain

Fill the Receiver as before; set the poise at 100%, as indicated in the bottom row of figuring, crowd the grain down and fill it until the scale balances with poise placed as above. This done winnow or otherwise clear the grain. Either the residue of the grain after such cleaning, or the waste removed by the cleaning process (either, but not both), being put back into the Receiver, move the poise to the point where poise will just balance, when by reading on the bottom line of figures the percentage of the amount originally weighed—either of clear grain or waste, as the case may be, will be shown.

Should the grain be light, as in the case of oats, set the poise at 50% instead of 100%, and fill the pail as before, balancing it at 50% and go through the same process as before, but in reading the percentage *double the actual figuring*, and it will give the per cent of the amount tested.

*** PLEASE SEND PHOTOGRAPHS FOR SHOWCASE ***

I have run out of photographs suitable for publishing in SHOWCASE. Please send me good clear photographs of scales or weights with a plain white background. Black-and-white negatives are preferred, but good prints or colour prints may be acceptable. Include brief details of size, graduations maker, materials, etc. EDITOR.

American Patent CCDs

A SERIES ON COUNTERFEIT COIN DETECTORS GEORGE MALLIS

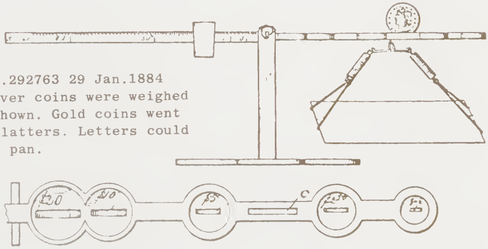
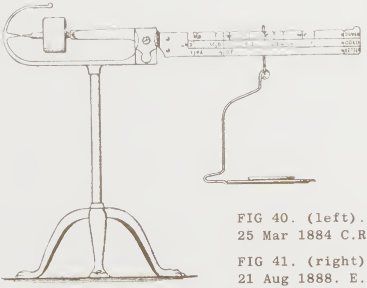


FIG 39. Patent No.292763 29 Jan.1884 E.C.Purnelle. Silver coins were weighed in slot 'C', as shown. Gold coins went in the circular platters. Letters could be weighed in the pan.

Purnelle's CCD had a metal beam with recesses and slots to gauge various coins, at one end. At the other end, the beam was graduated for a sliding weight. The beam pivoted on knife edges which rested in two pillars set on to a base. This device could be used to check both silver and gold coins. To weigh a gold coin, the sliding weight was set to zero, and the coin was placed in the relevant recess. Silver coins were all weighed in a single slot 'C', so the sliding weight had to be moved to a predetermined spot on the beam for each coin denomination. A suspended plate below the beam could be used for weighing letters.



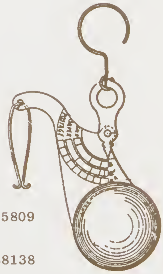


FIG 40. (left). Patent No.295809 25 Mar 1884 C.Richtmann.

FIG 41. (right) Patent No.388138 21 Aug 1888. E.Knight.

A very simple but accurate scale was patented by Richtmann for weighing gold and silver coins and letters. It had a beam with a fixed counterweight and a pointer at one end, and a graduated blade at the other end. A movable pan was suspended from the blade, and could be set in a predetermined notch for a particular coin, or for weight in ounces. There were three sets of graduations marked, 'Gold', 'Silver' and 'Letters'. This is not a CCD, as there was no means of gauging the size of the coin, or of weighing in water.

Knight's device had a weighted-plate beam suspended from a combined fulcrum and indicator. The narrow end of the beam had a spring clip to hold a coin or letter. The weight of the article tipped the beam around the fulcrum and its pointer indicated the weight. There were three sets of graduations marked, 'Gold', 'silver' and 'Postage'. There was no provision for gauging the diameter or thickness of the coin. (This device seems to be based on Hall's patent of 1863 - see EQM p.199, ED.)

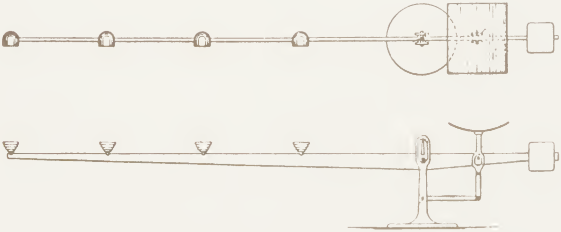


FIG 42. Patent No.314330 W.W.Haas. This is a banker's counting scale, rather than a CCD. A coin is inserted in one of the cups from the side, on the appropriate step, according to the number of coins to be counted.

Strictly speaking, the Haas patent was not for a CCD, but was for a bulk coin weighing device. It consisted of a beam with four identical, open-sided and stepped cups spaced along one arm. On the other arm was a weighing pan with a roberval linkage, and a fixed counterpoise. The cups were designed to hold one size of coin at each step or level. Further, the cups were placed at such a distance that a coin in the first cup would exactly counterbalance five coins of the same denomination on the weighing pan. The second cup would counterbalance ten coins, the third twenty coins and the fourth counterbalanced forty coins. Thus a bank could quickly count and weigh coins.

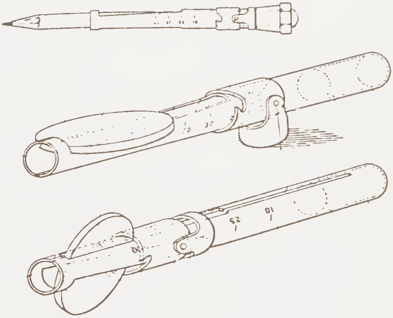
The device patented by Riess consisted of a tubular weighing beam combined with a pencil holder. A sleeve on the tube had a dual purpose. It provided an adjustable diameter gauge for the coin which was placed in a slot through the tube, Fig 43. For weighing, a pivoted section of the sleeve was hinged down to form a small base, and the coin was placed, horizontally, in a recess at the end of the tube, Fig 43. The sleeve was set to a predetermined mark for the denomination of the coin (a sort of bismar). This instrument was also patented in England, (see EQM pp.275/6)

FIG 43. Patent No. 549534 R.W.Riess.

Top: The instrument in use as a pencil holder.

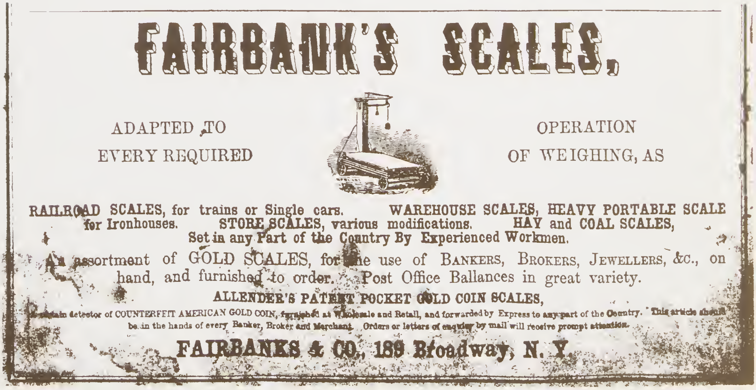
Centre: in use as a coin balance - a bismar.

Bottom: A coin being gauged using the slot and sliding sleeve.



Old Advert

From Dye's Banknote Plate Delineator, New York, 1855.



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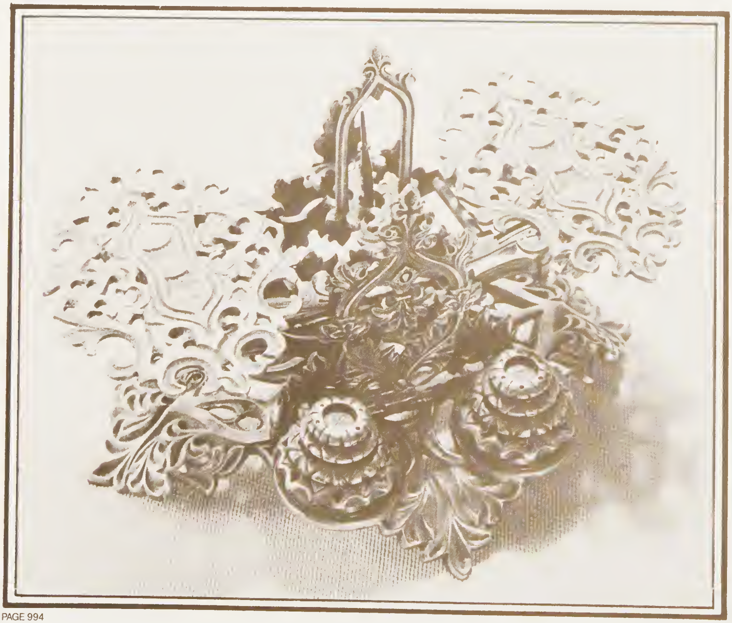
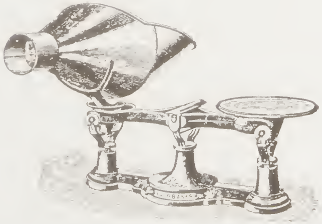


Cover Picture

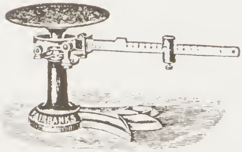
DIANA CRAWFORTH

This ornate postal scale is anonymous and looks as if it is unique, but several have been seen in this style. The maker was English and one of his similar designs was Registered in 1856. He worked entirely in brass and, unlike other makers, did decorate all parts of the scale consistently, putting leafy curls even on the beams and stays. Usually, he put a flat pierced brass base on the scales which looks as if it might have sat on a wooden plinth, but none have been seen mounted in this way. This set is unusual in having curved-down leafy feet and two sets of this maker's distinctive weights which always had deeply notched patterns around the edge, each denomination a different design, for 2,1,½, and ¼ oz. Although this scale is not very efficient for weighing, it made an attractive ornament for the Victorian desk. (See also, EQM p.980, Fig 2).

Illustrations from the Fairbanks' catalogue of 1906.



Grocers' Even Balance Trip Scales



Glass Blowers' Scale.

INTERNATIONAL SOCIETY OF ANTIQUE SCALE COLLECTORS

Founded September, 1976

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Associate Editor — Diana Crawforth

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Oxford OX5 1NE England

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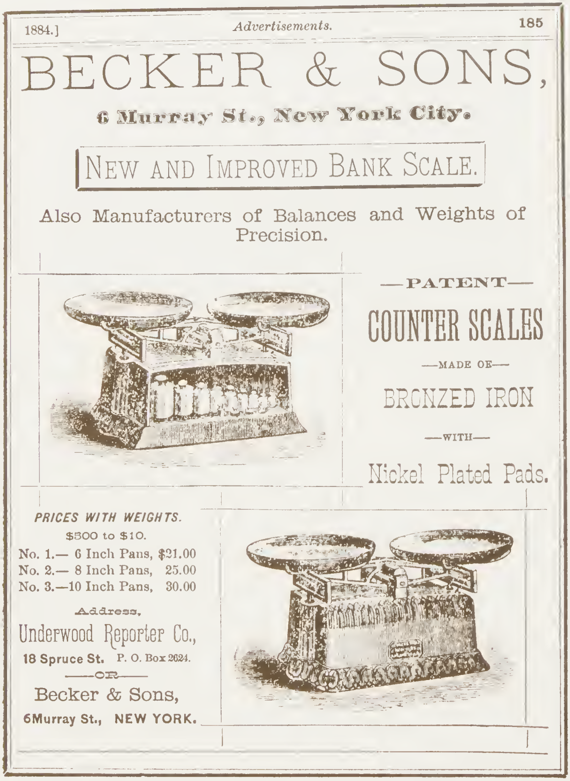
Old Advert

From Underwood's COUNTERFEIT REPORTER March 1884
sent in by Eric Newman.



1884.] *Advertisements.* 185

BECKER & SONS,

6 Murray St., New York City.

NEW AND IMPROVED BANK SCALE.

Also Manufacturers of Balances and Weights of Precision.

—PATENT—

COUNTER SCALES

—MADE OF—

BRONZED IRON

—WITH—

Nickel Plated Pads.

PRICES WITH WEIGHTS.

$300 to $10.

No. 1.—	6 Inch Pans,	$21.00
No. 2.—	8 Inch Pans,	25.00
No. 3.—	10 Inch Pans,	30.00

Address,

Underwood Reporter Co.,
18 Spruce St. P. O. Box 2624.

—OR—

Becker & Sons,
6Murray St., NEW YORK.

A Tale of Two Companies

Torsion Balance Co

TOD CARLEY

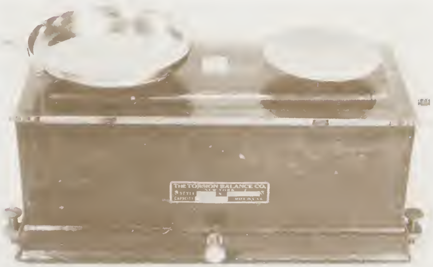


FIG 1.

Christian Becker

Torsion balances are roberval balances, but the knife edges have been replaced by taut metal bands, i.e. "torsion" bands, Fig 2. The horizontal beams are like a normal roberval balance, but the vertical legs have been replaced by metal trusses or frames, and a similar truss has replaced the main fulcrum. This central truss is fixed rigidly to the base for the whole scale to pivot on. The torsion bands are tightly wrapped around the outside edge of the trusses, and the horizontal beams are attached only to these bands. The pans are attached to the outer trusses, so when a load is put on a pan, the truss is displaced downwards forcing the beam down with the band. As the band is thin and flexible, it twists easily with virtually no friction, then straightens out into a flat band again when the beam is returned to the horizontal position. Thus, the twisting of the band replaces the turning action of a knife on the bearing of an ordinary scale.

The advantages of the Torsion principle are:-

1. Elimination of friction. No part moves against another.
2. Elimination of wear from dust and dirt.
3. Once adjusted at the factory, accuracy and sensitivity are permanent. Reduced maintenance.
4. High sensitivity coupled with high capacity.

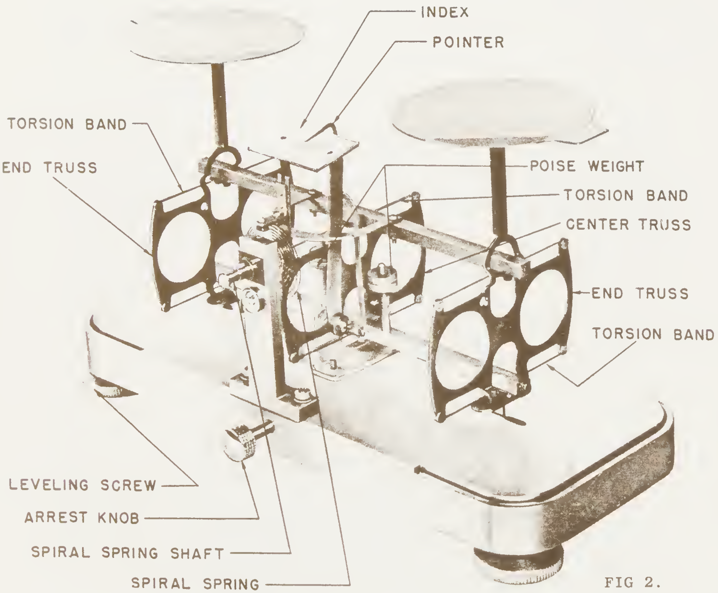


FIG 2.

The dial mechanism on the front of the central truss, Fig 2, gives a quick reading for the final weighing. Instead of using tiny weights for the fractions of a unit, the user turned the spiral spring knob gradually applying more pressure to one side of the beam until equilibrium was reached. The weight read from the knob dial was added to the weights in the pan.

CHRONOLOGICAL HIGHLIGHTS IN THE HISTORY OF THE TORSION BALANCE COMPANY

THE TORSION BALANCE & SCALE CO. of Cincinnatti, Ohio, was formed in 1882 by Dr.Alfred Springer and Prof. Frederick A.Roeder, after Patent No.262905 Fig 3, was granted to Roeder, with one half assigned to Springer. Originally, the torsion bands were round gold wires carefully soldered to the two balance beams. In 1889, a one-piece truss was developed and the gold wire was changed to a flat metal ribbon or band which could be clamped to the beams. Both these improvements helped with production manufacturing.

THE UNITED STATES TORSION BALANCE AND SCALE CO. became the company name in 1885, and the factory was relocated in Jersey City, NJ, and the offices at 92 Reade Street, New York, NY.

THE SPRINGER TORSION BALANCE CO. was the next company name, in 1894. The cover of their catalogue of 2nd November 1894, is shown in Fig 4. The quaint trade mark had been used earlier in their advertisements and literature, where it was described thus:

See-sawing on a Torsion Balance

> *These children, Alois and Frederika, were caught by the photographer in the act of balancing themselves on a new Torsion balance. The boy weighs 47 pounds, and the girl 45 pounds. The balance was not injured in the slightest degree, and a test made shortly afterwards showed that when balanced with 50 pounds on each pan, an addition of 2 grains to either pan would cause a perceptible movement, and 10 grains would give "down weight". The Torsion Balance is the only balance in the world that will stand such a test.*

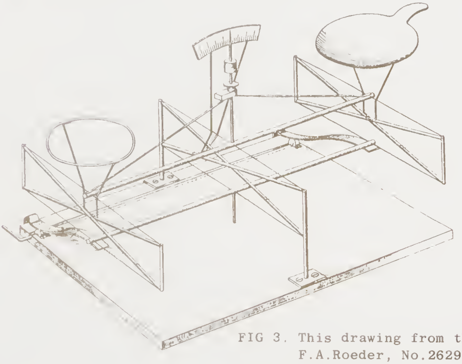
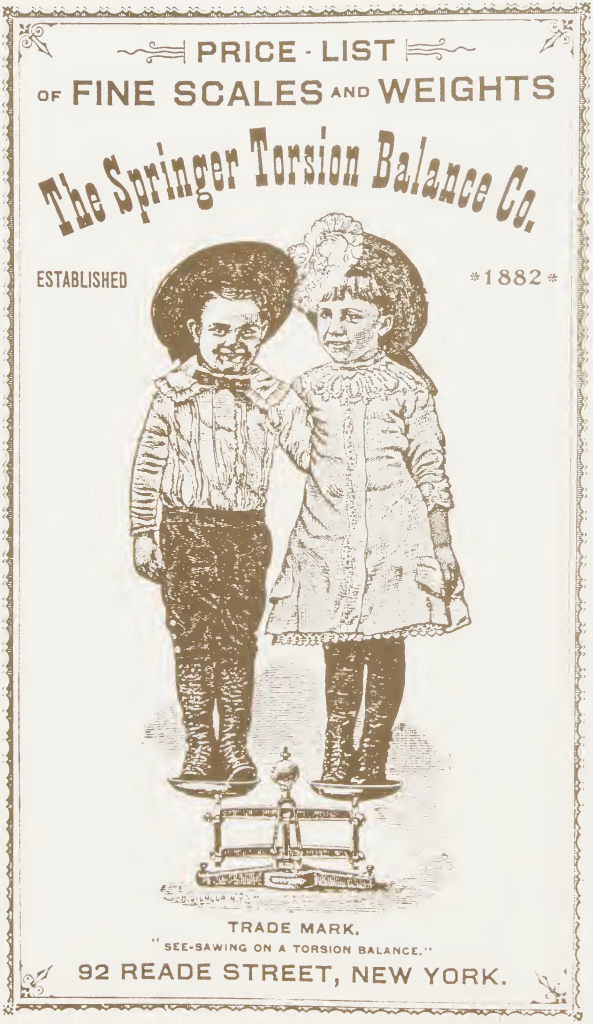


FIG 3. This drawing from the patent by F.A.Roeder, No.262905 of 15 Aug. 1882, shows thin round wires instead of the flat metal strips used later for the torsion bands.

THE TORSION BALANCE COMPANY was organised under the laws of the State of New York on 7th January 1902, and this name lasted for the next eighty years.

On February 8th, 1915, the Torsion Balance Co. purchased Christian Becker and formed a New York corporation called Christian Becker, Inc. (An outline of the Becker family history is given below).

Ever since the move from Ohio, the corporate offices had been in New York City and the manufacturing facilities in Jersey City. In May of 1949, each moved to a new plant that had been erected in Clifton, New Jersey.



PRICE - LIST

OF FINE SCALES AND WEIGHTS

The Springer Torsion Balance Co.

ESTABLISHED *1882*

TRADE MARK.

"SEE-SAWING ON A TORSION BALANCE."

92 READE STREET, NEW YORK.

FIG 4.

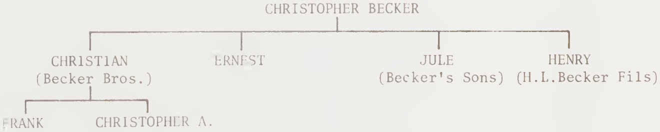
VERTEX INDUSTRIES, INC. purchased The Torsion Balance Co. in 1975, and in 1983 Vertex Industries Inc. merged with its subsidiaries and the Torsion Balance Co. became the TORBAL DIVISION of Vertex Industries, Inc.

In its early years, The Torsion Balance Co. seemed to have difficulty deciding on the best name for the company. However, there is no evidence of indecision in their marketing effort. They had a product with unique, well-patented features and they picked specific markets and concentrated on them. One of the first ones they tried was retail druggists. They had their own sales representatives and sold mostly direct to the druggist. Some sales were also made through wholesale supply houses. The product had features that appealed to the druggist and the sales approach paid off. In their advertisements they claimed to have Torsion Balances in 85 per cent of the drug stores in the United States.

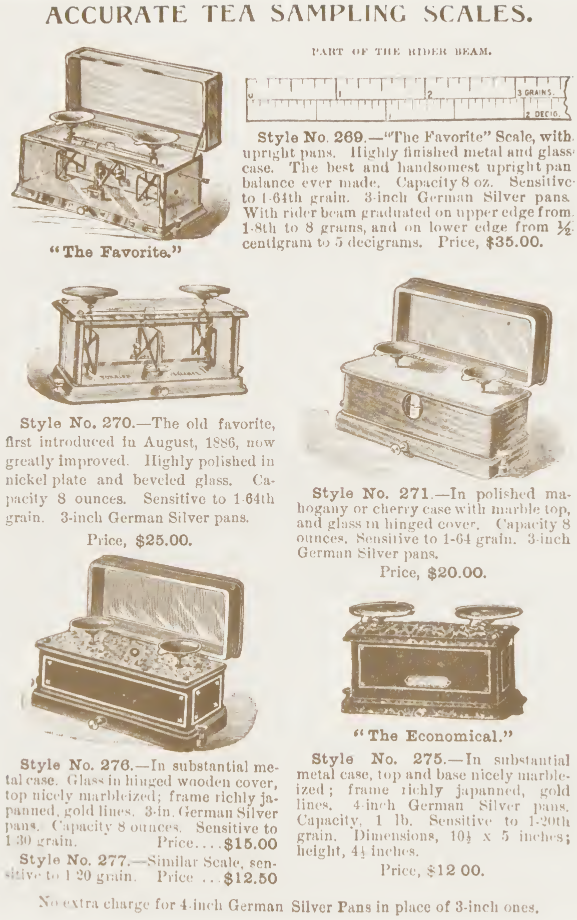
Torsion Balances were less costly and less sensitive than analytical balances. Nevertheless, there was a definite need in laboratories for such a balance. The Torsion Balance Co. took advantage of the Christian Becker entree into laboratories and gradually built the sales in this market to the point where they became second only to the prescription drug market.

Today, the Torbal Division of Vertex Industries Inc. has a complete range of laboratory balances, including: Electronic Analytical, Electronic top-loading, Optical Projection, Dial Reading, High Capacity, Prescription and Dairy balances. These range from 160g capacity to 14kg capacity, all with the unique friction-free torsion principle. Fig 6 is taken from the cover of their current catalogue which illustrates each type mentioned above.

The history of the Becker family in the USA before Christian Becker was purchased in 1915 by the Torsion Balance Company necessitates a return to the beginning of Christopher Becker's activities in the United States, in the year 1836:



1836: Christopher Becker, born in Filsum, Hanover (see EQM p.477) emigrated from Arnheim, Holland, with his elder sons, Christian and Ernest, and established an observatory at 54 Columbia St, in Brooklyn, NY, where he manufactured nautical and astronomical instruments. From his observatory, he gave the correct time to ships in the harbour by means of a ball on top of the observatory. The ball was controlled electrically and coordinated with an extremely accurate temperature-compensated clock that Christopher had built. The accuracy was checked periodically by astronomical observations.



ACCURATE TEA SAMPLING SCALES.

PART OF THE RIDER BEAM.

0
1
2
3 GRAINS.
2 DECIG.

Style No. 269.—"The Favorite" Scale, with upright pans. Highly finished metal and glass case. The best and handsomest upright pan balance ever made. Capacity 8 oz. Sensitive to 1-64th grain. 3-inch German Silver pans. With rider beam graduated on upper edge from 1-8th to 8 grains, and on lower edge from ½ centigram to 5 decigrams. Price, **$35.00.**

"The Favorite."

Style No. 270.—The old favorite, first introduced in August, 1886, now greatly improved. Highly polished in nickel plate and beveled glass. Capacity 8 ounces. Sensitive to 1-64th grain. 3-inch German Silver pans.

Price, **$25.00.**

Style No. 271.—In polished mahogany or cherry case with marble top, and glass in hinged cover. Capacity 8 ounces. Sensitive to 1-64 grain. 3-inch German Silver pans.

Price, **$20.00.**

"The Economical."

Style No. 276.—In substantial metal case. Glass in hinged wooden cover, top nicely marbleized; frame richly japanned, gold lines. 3-in. German Silver pans. Capacity 8 ounces. Sensitive to 1-30 grain. Price....**$15.00**

Style No. 277.—Similar Scale, sensitive to 1-20 grain. Price ...**$12.50**

Style No. 275.—In substantial metal case, top and base nicely marbleized; frame richly japanned, gold lines. 4-inch German Silver pans. Capacity, 1 lb. Sensitive to 1-20th grain. Dimensions, 10½ x 5 inches; height, 4½ inches.

Price, $12 00.

No extra charge for 4-inch German Silver Pans in place of 3-inch ones.

FIG 5. A page from the 1894 catalogue of
The Springer Torsion Balance Co.

1854: The precision capabilities demonstrated by Christopher attracted the attention of Prof. J.Renevick of Columbia College, who asked him to manufacture an analytical balance to supplement several British and German ones that he already had. The project was a success and resulted in Christopher forming a company called Becker & Sons, to manufacture balances and weights. Christian and Ernest were the 'Sons'.

1861: Christopher, Christian and Ernest returned to Holland and established a manufactory for balances in Antwerp. Jule and Henry, two other brothers, participated in this venture and acquired their initial knowledge of balances.

1865: When the Civil War ended, Christopher, Christian and Ernest returned to the United States and established a new factory in Hudson City, NJ. At about the same time Jule and Henry established Becker's Sons in Rotterdam, and H.L.Becker Fils, in Brussels.

1874: Between 1865 and 1874, Christopher moved his factory twice, first from Hudson City to Newark, NJ. and then to New Rochelle, NY.

1884: Christian and Ernest left their father and started their own business as Becker Brothers. The father changed the name of his surviving company to Christopher Becker. For a short while, prior to Christopher's death, there were two Becker companies doing business in the area.

1892: Ernest died and the name of the company, Becker Bros. was changed to Christian Becker.

1915: The Torsion Balance Co. bought the company and formed a New York Corporation called Christian Becker, Inc. This same year, Christopher Junior was granted a U.S. patent for the Chainomatic Weighing Device and received the Franklin Medal for this development (see EQM p.620).

1943: Christian Becker, Inc. was dissolved and became a division of The Torsion Balance Co. Shortly afterwards, the name Christian Becker was registered as a trade-mark with the U.S. Patent Office. Christopher and Frank continued to be associated with the Torsion Balance Co. until their deaths - Christopher in 1949 and Frank in 1956.

Over the years, Christian Becker had earned a reputation as a manufacturer of high quality balances. In more recent years the line has gradually been integrated with Torsion Balance, Co. Conventional design has given way to the Torsion principle and to electronics, but the Christian Becker logo is still used on Torbals analytical balances.

ACKNOWLEDGEMENT

The author is indebted to C.T.Kasline, Product Marketing Manager, Torbal Division, for most of the basic material used in this article.

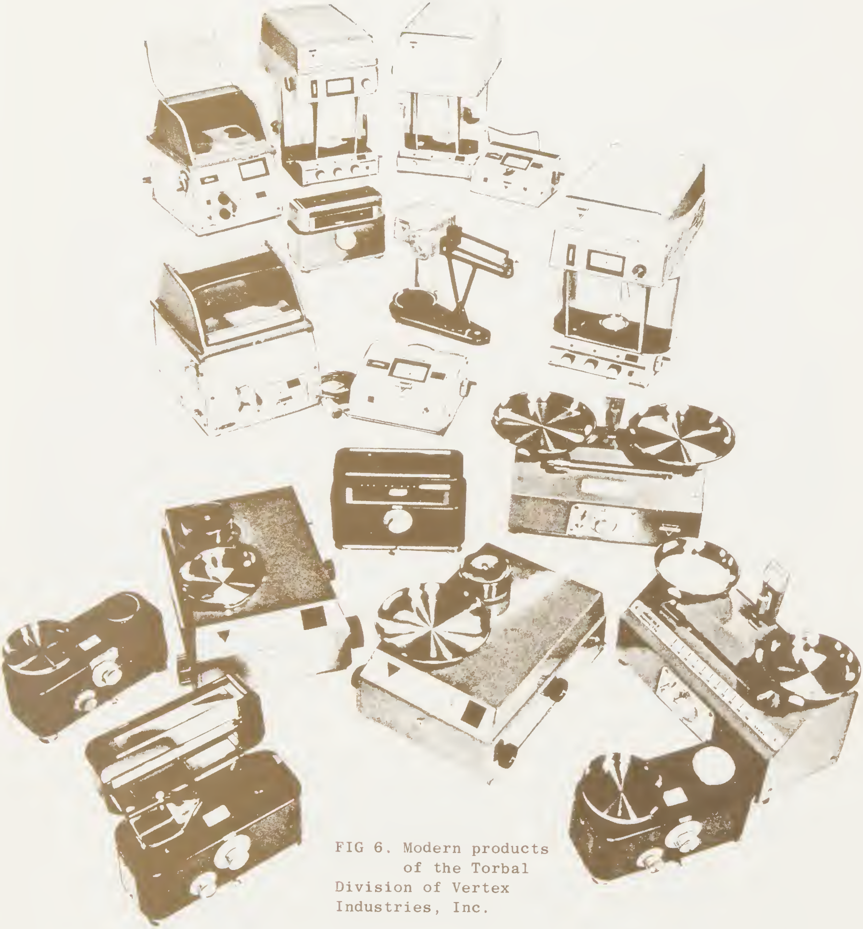


FIG 6. Modern products of the Torbal Division of Vertex Industries, Inc.

EDITOR'S NOTE: As Lou uit den Boogaard said at the end of his article on the Beckers (EQM pp 477, 478), the Becker story is very complicated and needs much research. For example, in Europe, where does the firm George & Becker fit into the story? Or F.E.Becker & Co.? Or Christopher's fifth son?

British Date Marks

MICHAEL CRAWFORTH

Many weight collectors will be familiar with the letters and figures which were stamped on British weights, usually on the bottom, and sometimes next to the verification mark*. Some of the marks are obviously a date (e.g. 1921, 89, or 11/27), but others are obscure and their meaning is not self-evident (e.g. E3, 12-N or S). Most of these obscure marks were also dates, and an explanation of the code systems used appeared in *The Inspector's Weights and Measures Handbook* for 1912-13.

The great majority of authorities used the last two figures of the year (e.g. 97 represented 1897). Sometimes, this figure was used in conjunction with a letter or figure representing the month. The location of the letter differed according to the authority concerned; the letter could be in front or after the year figure (e.g. B23, 37C), or above or below the year figure $\overset{B}{23}$ $\overset{27}{B}$, with or without a line between $\overset{B}{23}$ $\frac{B}{23}$. Some authorities used the date in full (e.g. 1909), but a few used only the last figure of the year, so it is impossible to determine whether, say '5', referred to 1895, 1905, 1915,.. or any other year ending in 5!

More obscure systems involved the use of a code letter or a code number for the year (e.g. R or 5), sometimes combined with a letter or figure representing the month (e g. E7). A few authorities referred only to quarter-years, and Rochester used the figures 1 to 6 for the months January to June and then repeated 1 to 6 for July to December. In Huddersfield, and one or two other districts, the figures 1 to 9 represented January to September, and then for some obscure reason, there was a change to the letters O N D for October, November and December (e.g. 12-6 was June 1912, 12-N was November 1912). Explanations in the Handbook were sparse and not always clear. Gloucester, for example, was said to use the *"First twelve Greek letters"* for the date. Did this mean a cycle of 12 code letters for the years, or did it refer to the twelve months? Suffolk used the *"Year in an oval ring"* and Stafford the *"last two figures in the loop of crown"*. Unfortunately, these examples were not illustrated.

It appears that, in order to minimise costs, many authorities had separate stamps for the year and month, as can be seen by the inconsistent relationship between the month letter and year figure. Several weights seen by the author had stamps where the month code was omitted (e.g. /06, /07) either intentionally or accidentally.

Applying date stamps to weights was permitted under the Regulations of 1890, but was made mandatory in the 1907 Regulations. However, it was not customary in Britain to stamp the date of every inspection. If no adjustment was required, the existing stamp was considered valid. This was left to the discretion of the inspector, who was advised by the Regulations that *"Where necessary..."* he should *"...set forth in his annual report the date mark used* ▷

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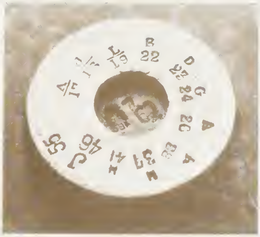
* *Verification marks were covered in a six-part article 'British Verification Marks' EQM pp 20-24, 43-48, 67-72, 90-96, 115-124, 163-165.*

B
48

B
23



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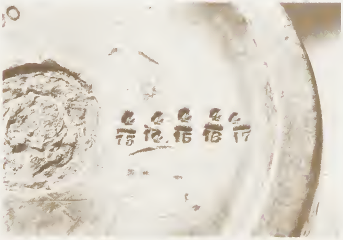
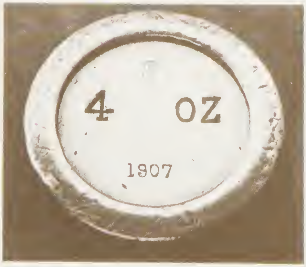
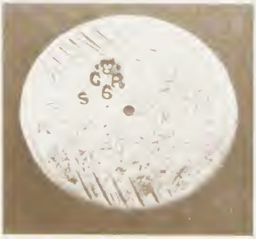
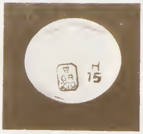



4 OZ
1907


C R
S 6


H
15

during the period covered by the report". Without such a report, it is now impossible to decipher some of the marks. In general, it may be assumed that coded or abbreviated date stamps were used after the Regulations of 1890. Full date stamps were used, occasionally, before that date.

The following table shows the variety of date systems in use in 1912, but only one example of an authority is given for each system. Many more authorities used the same systems but they are too numerous to mention here.

DATE CODE SYSTEMS USED BY WEIGHTS & MEASURES AUTHORITIES SINCE 1878 - U.K.

EXAMPLE OF AUTHORITY	YEAR ONLY E.G. 1912		EXPLANATION OF DATE SYSTEM
Bedford	1912		Year in full.
Arbroath	12		Last two figures of the year.
Leicester	2		Last figure of the year.
Chesterfield	R		Code letter for the year.
Stranraer	4		Code number for the year.
	YEAR & MONTH Mar.1912	Nov.1912	
Airdrie	C 1912	K 1912	A - L for month, year in full.
Bradford	1912 C	1912 K	Year in full, A - L for months.
Brighton	E 3	E 11	Code letter for year, 1-12 months.
Bristol	12 C	12 K	Last 2 figs year, A - L months.
Burton on Trent	C/2	K/2	A - L months, last fig. of year.
Cambridge	C/12	K/12	A - L months, last 2 figs of year.
Chester	$\frac{3}{1912}$	$\frac{11}{1912}$	1-12 months over year in full.
Colchester	A 12	D 12	A B C D for ¼ years, last 2 figs.
Croydon	3 12	11 12	1-12 months, last 2 figs of year.
Darlington	3/12	11/12	1-12 months, last 2 figs of year.
Derbyshire	$\frac{A}{12}$	$\frac{D}{12}$	A B C D for ¼ years, last 2 figs.
Essex	1/2	4/2	1-4 for ¼ years, last fig of year.
Great Yarmouth	3/2	11/2	1-12 months, last fig of year.
Guildford	12/1	12/4	Last 2 figs year, 1-4 for ¼ years.
Huddersfield	12-3	12-N	Last 2 figs of year, 1-9 for Jan. to Sep. O N D Oct. to Dec.
Rochester	D3	D5	Code letter for year, 1-6 for Jan. to Jun. 1-6 for Jul. to Dec.
Rotherham	3 12	N 12	1-9 for Jan. to Sep. O N D for Oct. to Dec., last 2 figs of year.
Sheffield	$\frac{3}{12}$	$\frac{N}{12}$	ditto.
Stoke on Trent	$\frac{P}{3}$	$\frac{P}{11}$	Code letter for year, 1-12 months.

36 3 37 C

/09
/07
/08

27 K

CONDEMNED
H-13
CONDEMNED

105 14 15

Letters

IRISH COIN WEIGHTS

I have been intrigued by the fact that the majority of Irish coin weights appears to represent Continental gold coins, such as moidores, pistoles etc. Indeed, Sheppard & Musham, in Money Scales and Weights, comment (p.217) in reference to Irish weights that *"to judge by their remains they seem much stronger in examples equivalent to the weight of the 'French Louis d'or of the new species' than the British sets."*

While researching excise duties in relation to 18th century boxwood slide rules, I stumbled across a Bill proposed to Parliament in 1737, which, in fact, never reached the Statute Books. This related to the illicit export of wool from Ireland to Portugal and other foreign parts. The Bill, entitled *The Golden Fleece or The Trade, Interest and Well-being of Great Britain considered with the present decay of our Woollen Manufactures,* is reproduced in part, below, showing clearly that the preponderance of Irish weights representing foreign gold coins was brought about by the clandestine dealings in wool carried out by the Irish with continental countries which created an influx of gold coins into Ireland.

Albert Rangeley

PAGES 26 & 27 OF THE BILL:

It is to be noted that every Pack of Wool, manufactured in Ireland over and above their Home Consumption, is almost the same Loss to the Manufacturers of Great Britain, as if manufactured in Foreign Countries, and contrary to the many Laws in Force.

The Specie of Ireland are chiefly Moidores, Dubloons, and Pieces of Eight, which evinces that great Quantities of Woollen Goods, thoroughly manufactured in Ireland, are clandestinely carried to Portugal, and other Foreign Parts. This Truth was proved before the Committee of the House of Commons, Anno 1731, of which Mr. Baron Scroop was Chairman...

The Bill goes on to recommend that the export of Irish wool to continental countries should be prevented and, in return, allowed to be imported into Great Britain free of duty. This, it said "*...would be cultivating a Friendly Understanding with Ireland by making it their Interest as well as our own, by reason they would receive ready Money from us, instead of those perishable Commodities of Wine and Brandies from France.*" Further compensation was to be offered in the expansion of Ireland's fishing industry.

MORE AMERICAN SCALES

I have waited all these years for you to put out more information on American-made scales of which there are hundreds - I know as I have so many... Lets get back to USA scales - or this is my last $35.

O.H.Schwandermann.

REPLY

I fully agree with you that there is too much about English scales and weights, and not enough about American scales and weights (and not enough about other countries' scales and weights, too). As Editor, I have to work with the material that is sent to me, plus a few articles that I ask for from people who I think may be prepared to write for Equilibrium. I use 95% of the material that is sent to me - only a small amount is rejected. I have several times asked for articles about American weighing instruments, but only a few have been sent to me. It is up to AMERICANS to supply the information - no one else has the opportunity to do the appropriate research. The following analysis of articles published in EQM shows that, relative to the number of American members, contributions from Americans are few:-

COUNTRY	% OF MEMBERS	% OF ARTICLES CONTRIBUTED
U.K.	13	49
U.S.A.	71	22
Germany	5	10
Holland	3.6	8.6
Israel	0.7	2.8
France	2.0	1.9
Spain	2.0	1.9
Japan	0.3	0.9
South Africa	0.3	0.9

I suppose that, in an ideal world, the figures in each column would be roughly the same, i.e. America should have contributed about 70% of the articles. In practice, historical factors have provided some countries with much richer materials and records than others, and some nations are more research minded than others.

I am always delighted to receive contributions for consideration, from ANY COUNTRY. I suggest that ALL members should ask themselves 'Have I done MY share to help the enjoyment of everyone?' Contributions can be made at all levels - you do not have to be an expert - from photographs for Showcase, letters to the Editor, through single page descriptions of a scale, to a full-size article or series.

In the near future, I have two American articles* ready for publication and a third in preparation. I hope they will satisfy at least some of your desires.

Editor.

** The first appears in this issue - A Tale of Two Companies.*

SCALES AND WEIGHTS OF THE OLD AUSTRIAN EMPIRE

I am presently completing an annotated and illustrated edition of *Hakhnasat Kalla* by the Nobel laureate, S.Y.Agnon. For this purpose I would be interested in receiving photographs of scales and weights used in the produce markets of the Austrian Empire, specifically in Poland or Eastern Galicia (Ukraine), during the early part of the nineteenth century. I would also like any information about government supervision and regulation of such scales and weights.

Should you have such scales and weights in your collection, please photograph them for me, send the photographs by AIR MAIL, and bill me for both the photographs and the postage. Please inform me of all copyright regulations related to the use of this material in publications.

If you have no such items in your collection, may I request that you tell me where I might be able to obtain such photographs or other materials.

Prof. Avraham Holtz.

If any member can help Prof. Holtz, please write to him c/o The Jewish Theological Seminary of America, 3080 Broadway, New York, NY 10027-4649.

SCOTTISH WEIGHTS AND MEASURES

Dr.Connor, whose book on English weights & measures is about to be published, is now researching Scottish weights & measures. This new work will be published in association with the National Museums of Scotland. These objects have not been studied critically before and there are many important questions which can only be answered by a close examination of the objects. Dr. Connor would be pleased to hear of any Scottish weights or measures (pre 1826) in your collection or known to you. *(summary of a letter to the Editor)*.

If any member can help Dr.Connor, please write to him c/o Royal Museum of Scotland, Chambers St, Edinburgh, EH1 1JF, Scotland.

⁂

English Coin-Weights 5

NORMAN BIGGS

The proliferation of square coin-weights in the period 1620 - 1630 led to many abuses: it was claimed that unscrupulous people used one set of weights for selling and another for buying. A group of London tradesmen petitioned the King on this matter in 1631, and the problem was referred to a committee under the Lord Mayor (17, p.111). After some delay, a proclamation (14, p.366) was issued on 20 December 1632, which decreed that henceforth all coin-weights should be *"of a round and circular forme"*, and that *"none of them shall be made with the remedies and abatements purposely taken off (commonly called Blancke weights)"*.

The preparations for this fundamental change had been in progress for some time, for in May 1631, the King had invited Sir Thomas Aylesbury to take charge of all matters relating to gold weights (17, p.46). Thus it was probably Aylesbury who authorised the famous engraver Nicholas Briot to make the dies for the new round weights, a task which he accomplished with great distinction.

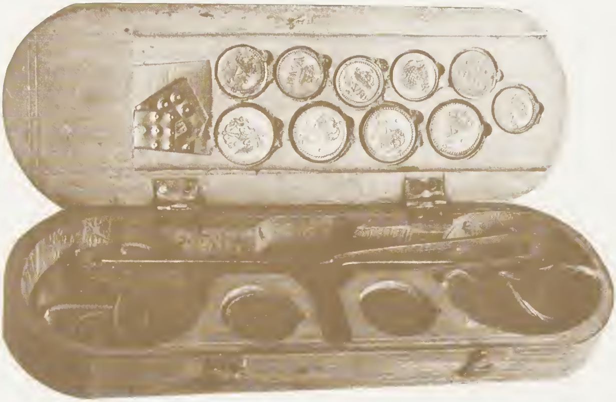


FIG 1. English money scales c.1635

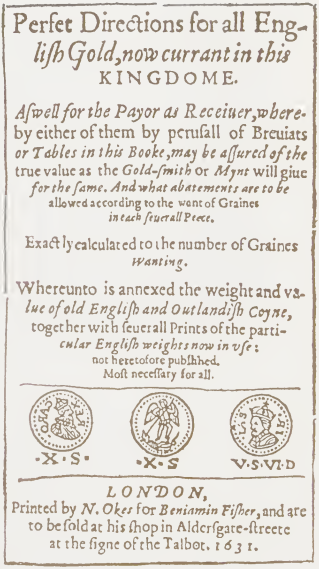
There were twelve weights in the set designed by Briot. An example of each denomination is illustrated in Figs 3 - 14. It will be noticed that eight of the twelve weights are for the "odd" pieces issued under James I from 1604 to 1619, and many of them bear his portrait. These facts have sometimes misled people into thinking that the weights themselves were issued under James I, although, of course, we know that only square weights were issued in his reign. Many of Briot's weights bear the initial 'B' on the obverse, Figs 10 & 12, on the reverse Figs 3, 4, 6, 7, 8, 14, or on both, Fig 13. In several cases the same denomination exists with or without the initial, and in other cases the initial is placed differently in different examples. It is possible that the weights with a 'B' were struck from dies engraved by Briot himself, while those without a 'B' were from dies copied by another engraver, but the evidence for this is not conclusive.

Briot's weights were produced in large numbers and are still relatively common to this day. Special boxes for the twelve weights and a pair of scales were made, Fig 1; ten of the weights were stored in the lid while the weights for the 22s piece (commonly called the Jacobus) and the 20s piece (commonly known as the Carolus) were kept in the base.

There is also some contemporary evidence concerning the use of these weights. A little book of tables entitled *Perfet Directions for All English Gold* (23) was published anonymously, but its author is believed to have been John Reynolds, at that time a junior officer at the Mint, Fig 2. The book gives extensive tables of the values of gold coins of inferior weight, when they were supposed to be returned to the Mint as bullion. It also depicts the coin-weights, albeit rather confusingly, since many of the illustrations are laterally inverted (for example the head faces left instead of right).

John Reynolds was almost certainly the officer of the Mint responsible for the production of Briot's Weights. Unfortunately for him, he soon fell foul of Sir Thomas Aylesbury, and was accused of making false weights. It is not clear whether the charge was justified, but Aylesbury pursued it vigorously. Reynolds was thrown into the Fleet prison, from where he several times petitioned the Privy Council for his release (21, p.360). As a result of this affair, the King went to the unusual length of issuing a new Proclamation (14, p.420) threatening dire penalties for anyone producing or possessing false weights.

Despite the threats of this new proclamation, unofficial copies of Briot's weights do exist, Figs 17 & 18. Their engraving is noticeably coarser than that of the official weights, and the lettering is badly aligned. They seem to be contemporary with the official weights because there are examples for the angel and half-angel, coins which were not in commercial use after the reign of Charles I. There are also some very rare round weights for the rose-ryal and spur-ryal, which may or may not be official, Fig 19.


Perfet Directions for all Engliſh Gold, now currant in this
KINGDOME.

Aſwell for the Payor as Receiuer, where-
by either of them by peruſall of Breuiats
or Tables in this Booke, may be aſſured of the
true value as the *Gold-ſmith* or *Mynt* will giue
for the ſame. And what abatements are to be
allowed according to the want of Graines
in each ſeuerall Peece.

Exactly calculated to the number of Graines
wanting.

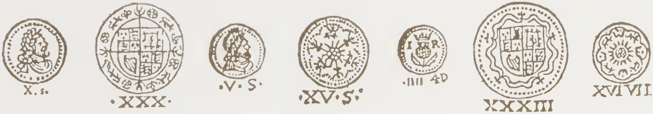
Whereunto is annexed the weight and va-
lue of old Engliſh and Outlandiſh Coyne,
together with ſeuerall Prints of the parti-
cular Engliſh weights now in vſe:
not heretofore publiſhed.
Moſt neceſſary for all.

LONDON,
Printed by *N. Okes* for *Beniamin Fiſher*, and are
to be ſold at his ſhop in Alderſgate-ſtreete
at the ſigne of the Talbot. 1631.

FIG 2.

In addition to the weights for the gold coins current at this time there is a separate group for the silver coins - the half-crown, shilling and sixpence. Very little is known about these weights, mainly because there is a complete lack of documentary evidence relating to them. The only thing that is certain is that they must have been issued during the reign of Charles I, because most of them bear the initials 'CR' in some form. Some of them represent the designs of the relevant coins in circulation at that time, in particular, the half-crown obverse of the King on horseback.

Illustrations from the book, above.



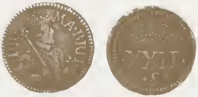
There are several types of these weights, and the situation is complicated by the fact that in some cases the obverse and reverse dies from different types have been combined to produce a 'mule'. What might be called the 'standard type' bears a symbol for the coin on the obverse, and a large crown over the initials 'CR' and the value on the reverse, together with a garnishing of roses, a small crown and a rampant lion. This type was produced in two versions: one version, Fig 18, has the words *WITHOUT GRAINS* encircling the obverse design, and the other version, Fig 19, has no such legend. Both versions of the shilling weight are illustrated by Lawrence (3, Plate I - 23 and I - 24). The significance of *WITHOUT GRAINS* in relation to gold-weights was explained in Part 4 of this series. There can be little doubt that the same explanation holds for the silver-weights: that is, the 'without grains' versions were intended for checking the least current weight of the coins, whereas the unmarked versions gave the full average weight of coins leaving the Mint. However, the scarcity and relatively poor state of preservation of specimens of these weights make it difficult to verify this scientifically. Once again, documentary evidence from contemporary sources is sorely needed.

Another type has a large 'C' on the obverse and a large 'R' on the reverse (Part 2, Fig 9). Inside the 'C' is a small TR monogram, the signature of Thomas Rawlins, a famous engraver. There are also several types bearing the mysterious letters WC, Fig 20.

The letters WC also appear on some scarce weights for the 'Spanish' silver ducatoon and its half, Fig 21. These weights were assigned to the Irish series by Crowther-Beynon (12), on the grounds that ducatoons were made current in Ireland by a proclamation of 1651. However, the coins were previously made current in England by Charles I, in 1644 (14), and the weights themselves bear no specifically Irish designation. Thus I prefer to regard them as part of the series of weights for silver coins current in England under Charles I.

From the start of the Civil War, there was a gradual decrease in the circulation of gold coins, and it appears that the production of coin-weights had virtually ceased by the late 1640s. In the first year of the Commonwealth (1650) the Council of State proposed to study how and where gold weights had formerly been made (22, p.192), and a year later Thomas Violet (described by Peck (20) as an unscrupulous adventurer) proposed to make a profit for the State by producing them (22, p.234). But there is no evidence that anything was done, and it seems likely that there was a complete break in the production of English coin-weights at this time.

In conclusion, it is worth remarking that the Commonwealth brought about a reversal in the fortunes of Sir Thomas Aylesbury and John Reynolds. Sir Thomas, an ardent Royalist, went into exile and died in Breda, in 1657. John Reynolds was reinstated as an official of the Mint, and collaborated with the leading men of science of the day in carrying out delicate experiments (24). He died about 1663, a respected figure in the world of learning.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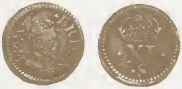
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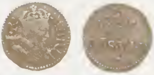
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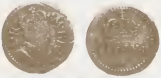
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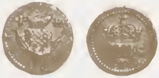
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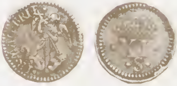
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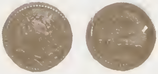
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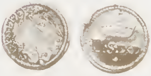
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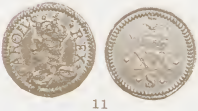
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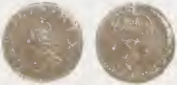
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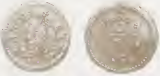
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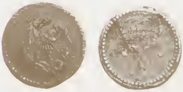
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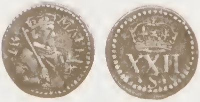
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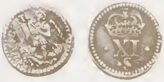
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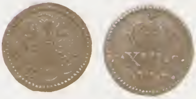
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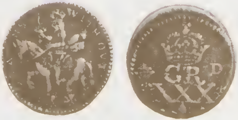
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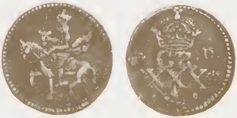
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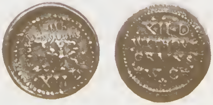
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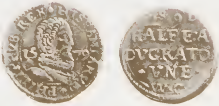
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CLASSIFICATION

The weights described in this Part conclude our survey of the so-called Jacobean period for English coin-weights. In addition to Group B, the square weights discussed in Part 4, there are two further groups:

GROUP C	Round weights for gold coins, issued under Charles I.
Subgroup C1	Official weights designed by Briot; Figs 3 - 14.
Subgroup C2	Unofficial copies of the above; Figs 15 & 16.
GROUP D	Round weights for silver coins, issued under Charles I.
Subgroup D1	Weights for English silver coins; Figs 18, 19 & 20.
Subgroup D2	Weights for foreign silver coins; Fig 21.

REFERENCES References 1-4 are in Part 1; 5-10 in Part 3; and 11-19 are in Part 4.

20. PECK C.W.: 'English Copper, Tin and Bronze Coins in the British Museum', London, 1970.
21. (Public Record Office): 'Calendar of State Papers, Domestic Series Charles I 1633-34', HMSO, London, 1863.
22. (Public Record Office): "Calendar of State Papers, Domestic Series, Commonwealth 1650-51', HMSO, London, 1877.
23. REYNOLDS J.: 'Perfe(c)t Directions for all English gold', London, 1631.
24. TAYLOR E.G.R.: 'The Mathematical Practitioners of Tudor and Stuart England', University Press, Cambridge, 1954.

ILLUSTRATIONS

3. Obv. ·I·R·MA·BRIT· around bust of James I. Rev. crown, XXIIs, signed B. 155gr. 18mm. c.1633. For unite of James I, second coinage (1604 - 1619). 155gr, valued at 22s from 1611.

4. Obv. I·R·M··BRITAN around bust of James I. Rev. crown, XIs, signed B. 77gr. 17mm. c.1633. For the half-unite of James I, second coinage (1604 - 19). 77gr. valued at 11s from 1611.

5. Obv. I·R··M·BRIT around bust of James I. Rev. crown, V·S·VI·D, 38gr. 14mm. c.1633. For the crown of James I, second coinage (1604 - 19) 39gr. valued at 5s 6d from 1611.

6. Obv. as No.5. Rev. crown, II·S·IX·D, signed B. 19gr. 15mm. c.1633. For the half-crown of James I, second coinage (1604 - 19). 19gr. valued at 2s 9d from 1611.

7. Obv. ·I·R· alongside thistle. Rev. crown, IIII·S·4·D½, signed B. 30gr. 14mm. c.1633. For the thistle-crown of James I, second coinage (1604 - 1619). 31gr. valued at 4s 4½d from 1611.

8. Obv. ·I·R·MAG·BRIT, St.Michael spearing a dragon. Rev. crown, XIs. 71gr. 17mm. c.1633. For the angel of James I, second coinage (1604 -19). 71gr of fine gold, valued at 11s from 1611.

9. Obv. I·R·M·BRI, St.Michael spearing a dragon. Rev. crown, V·S·VI·D signed B. 35gr. 14mm. c.1633. For the half-angel (issued rarely under James I), valued at 5s 6d from 1611.

10. Obv. as No.9, signed B below wing. Rev. crown, II·S·IX·D. 18gr. 14mm c.1633. For the quarter-angel (not issued by James I), valued at 2s 9d from 1611.

11. Obv. CAROLVS··REX· around bust of Charles I. Rev. crown, XXS. 140gr. 19mm. c.1633. For the laurel of James I and the unite of Charles I, 140gr. 20s.

12. Obv. CAROLVS·REX· around bust of Charles I, signed B below. Rev. crown, Xs. 70gr. 17mm. c.1633. For the half-laurel of James I and the half-unite of Charles I. 70gr. 10s.

13. Obv. CAROL··REX· around bust of Charles I, signed B below. Rev. crown, Vs, signed B. 33gr. 15mm. c.1633. For the quarter-laurel of James I and the crown of Charles I, 35gr. 5s.

14. Obv. St.Michael spearing a dragon. Rev. crown, Xs signed B. 64gr. 17mm c.1633. For the angel after 1619. 65gr of fine gold, 10s.

15. Obv. & Rev. as No.3, but poorer workmanship. 154gr. 19mm. Date doubtful. For the unite as No.3.

16. Obv. & Rev. as No.8, but poorer workmanship. 71gr. 17mm. Date doubtful. For the angel as No.8.

17. Obv. rose on spur, ornaments around. Rev. crown, ·XVI·S· ·VI·D. 106gr. 18mm. c.1640 ? For the spur ryal of James I, second coinage (1604 - 19). 107gr of fine gold, valued at 16s 6d after 1611.

18. Obv. king on horseback, two rampant lions below, WITHOUT GRANS around. Rev. crown, CR XXX^{D}. 223gr. 23mm. c.1640 ? For the half-crown from 1601. 232gr of silver. 2s 6d.

19. Obv. king on horseback. Rev. as No.18. 231gr. 23mm. c.1640 ? For the half-crown, as No.18.

20. Obv. with out grains, decorated CR, XII D below. Rev. XII·D WITHOVT GRAINS W C. 85gr. 20mm. c.1640 ? For the silver shilling from 1601, 93gr.

21. Obv. PHILIPPUS REX HISPAIARUM, bust flanked by 15 79. Rev. 2^{s} 9^{b}, HALFE·A DVCKATO ·VNE W·C. 248gr. 26mm. c.1644 ? For the 'Spanish' half-ducatoon minted in the Low Countries, 250gr of silver, valued at 2s 9d in England by the proclamation of 1644.

(EDITOR'S NOTE: The weights shown in Figs 3 to 14 are those which were usually included in scale boxes of the period).

Notes & Queries

NQ 94 FIRST U.S. POSTAL SCALE — Query from Betty Wright

What is the first known American postal scale ?

REPLY — from Tod Carley

I am willing to speculate on an approximate date, with Fairbanks being the first to make a postal scale in the U.S.

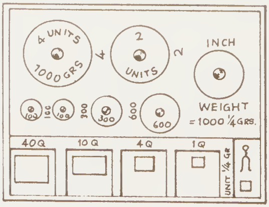
1789-1863	Primary basis for letter postage was number of sheets or pages.
1842	The envelope was introduced from France.
1845	Introduction of unit weight for letters - ½ ounce. Officially, it did not supplant 'sheets' but actually it gradually took over because it was so much more practical.
1847	Postage stamps were introduced.
1859	Fairbanks catalogue illustrates (p.37) "United States Post Office Balance" - "Adopted by Government". (p.38) "Fairbanks Improved Letter Balance" (Patent No.26026 Nov. 8, 1859.
1863-1885	Unit weight of ½ ounce continued to be used.
1874	U.S. Government ordered 3000 postal scales of various capacities from Fairbanks.
1885	Unit weight increased to 1 ounce.

Fairbanks was aggressive and innovative in the early days and I can't think of another manufacturer that cut the wide swath that they did. For a date I will pick 1845-1850.

NQ 95 INCH WEIGHTS — note from Jaap Visser

Regarding Inch Weights (NQ 93, p.956), I am in possession of an oak box 115 x 88 x 30mm (4.5 x 3.5 x 1.2 ins) with similar weights but differently stored. Near the sheet metal weights it is marked UNIT ¼ GR. The knobbed weights are stored in an oblong base of celluloid. On the outside of the lid there is a brass plate engraved:-

BRITISH GRAIN WEIGHTS
DECIMALISED & CORRELATED ON THE
INCH LENGTH
UNIT = 250 GRAINS = 1 CUBIC
INCH OF WATER AT 122° FAH.
$\frac{1}{1000}$ UNIT = ¼ GRAIN
Thomas Parker.



American Patent CCDs

A SERIES ON COUNTERFEIT COIN DETECTORS

GEORGE MALLIS

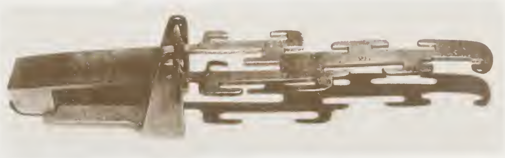
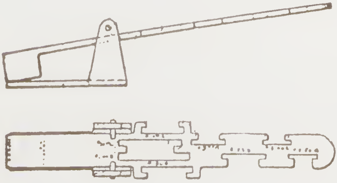


FIG 44. Bragin's unusual notched design.

Porter's design was a box-like device mounted on a wooden pillar. The box had slots of proper width and length to allow a coin of correct size to pass through. Inside the box, below each slot, was a counterbalanced beam on which the coin rested after passing through the relevant slot. A true coin tilted the beam and the coin was allowed to fall onto a tray on the extended part of the base.

A very simple detector was patented by Bragin. It consisted of a flat plate for a base with two vertical pillars to support a flat beam with pivots. At one end there was a counterweight, and at the other end there were slots and notches to receive gold and silver coins. The slots checked the size of the coin, while a genuine coin would tilt the beam indicating correct weight.

(NOTE: An illustration of this design was shown on EQM Page 875, Fig 17, and incorrectly attributed to Thompson. Readers should correct the caption accordingly. The EDITOR apologises to the Author for this error.).



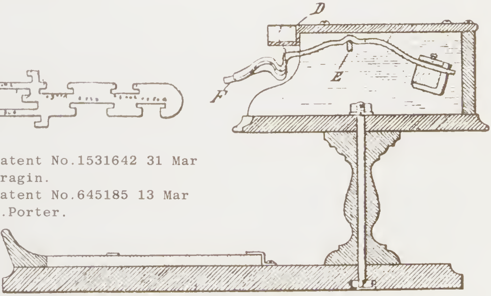
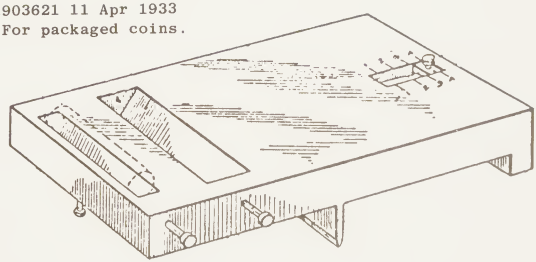
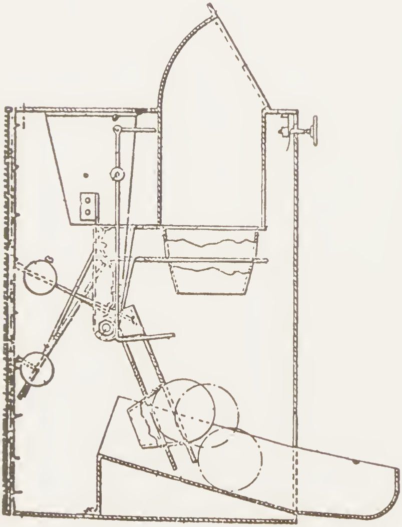


FIG 45. (above) Patent No.1531642 31 Mar 1925. L.Bragin.
FIG 46. (right) Patent No.645185 13 Mar 1900. T.I.Porter.

FIG 48. Patent No.1903621 11 Apr 1933
F.E.Finch. For packaged coins.



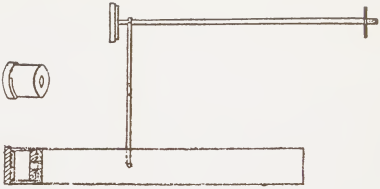
This device, patented by Finch, consists of a flat steel plate with a knife edge attached to the bottom. At one end is a fixed counterweight and a small movable poise with a graduated scale. At the other end there are two 'V'-grooves for holding rolls of coins. Projecting from the end of the grooves is a graduated bar used to determine the number of coins in the roll being checked. The bar was pushed from the side until it touched the roll of coins and the result was read from the graduations. The moveable poise was set to the correct value and if the coins were of proper weight, the plate would tilt down.



Parnell's instrument was a very complex device for weighing coins of different denominations. Basically, there were one or more balance beams onto which coins were dropped. If genuine, the coin would tilt the beam and roll into a discharge chute at the bottom of the box. The beams were contained in a box at the top of which there was a series of slots one above each beam. The slots were mounted at a convenient angle for the user to feed coins into the slots for checking the diameter and thickness in the usual way.

FIG 49. Patent No.2350414 6 Jun 1944. W.H. Parnell. A coin is shown rolling from the tilted beam into the discharge chute.

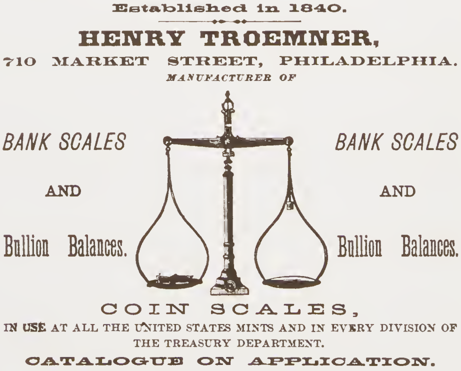
FIG 47. Patent No.9844
12 Jul 1853.
H.G.Robinson. The coin container is shown above its storage place in the tube. The slot gauge in the container is near the left end.



Robinson's design should have appeared in the first article in this series, as it was the first U.S. patent for a CCD. It was a simple instrument consisting of a cylindrical tube suspended from a rod by spring pivots. A small container screwed into the end of the tube had a slot for gauging the size of coin. In use, the coin was made to adhere to the end of the tube by spittle ! For carrying in the pocket, the rod and spring pivots were fitted inside the tube. The instrument could also replace a wallet, because coins could be stored in the container and notes in the tube.

Two other patents should be mentioned: No.156259 27 Oct.1874 by W. Schmolz, was a large equal-arm precision balance for weighing coins with great accuracy in banks or mints: No.867304 1 Oct.1907 by M.D. Saddler, was a complex coin testing apparatus for use in coin-operated machines.

If any reader knows of an American CCD not mentioned in this series of articles (or mentioned but not illustrated by a photograph) please send details to the Author, or the Editor, so that the CCDs can be described or shown in a supplementary article.



Established in 1840.

HENRY TROEMNER,

710 MARKET STREET, PHILADELPHIA.

MANUFACTURER OF

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AND

Bullion Balances.

BANK SCALES

AND

Bullion Balances.

COIN SCALES,

IN USE AT ALL THE UNITED STATES MINTS AND IN EVERY DIVISION OF THE TREASURY DEPARTMENT.

CATALOGUE ON APPLICATION.

From 'The Government Counterfeit Detector' March 1879. Sent in by Eric Newman.

ISASC

EQUILIBRIUM

QUARTERLY MAGAZINE OF THE INTERNATIONAL SOCIETY OF ANTIQUE SCALE COLLECTORS

1987-ISSUE NO. 3

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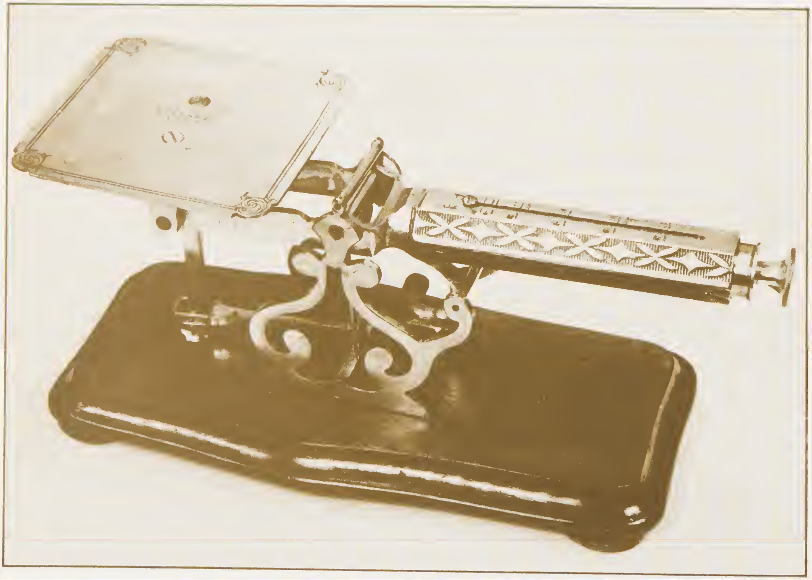
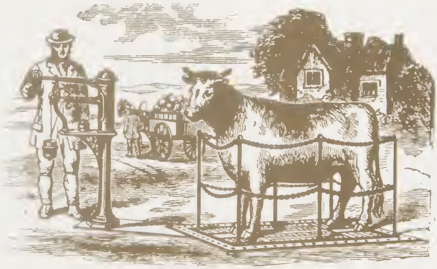


Cover Picture

Table-top steelyards were a relatively scarce form of postal scale, and those with a telescopic pull-out weight were rare. This example was stamped "S. TURNER'S PATENT" and was probably made by Samuel Turner, Snr. of Birmingham, England. Certainly, the construction is typical of the Turner factory. The patent was in the name of G.Loughton, and presumably it was acquired by Turner (see EQM p.482). In comparison with the rugged design in the patent, this scale is elegant and decorative, with attractive designs stamped onto the letter plate and the hexagonal tubular beam. The postage rates were current from 1871 to 1897. (See article pp.1026-1035).



AGRICULTURAL WEIGHBRIDGE.

Sent in by Alan Garratt

The simplest and cheapest Machine for Farmers' Carts and Live Stock. It is *complete within itself*, requires no masonry or brickwork, and may be put in its place by any intelligent labourer, on any part of a farm, in a few hours. Posts and chains, forming a pen to receive Cattle to be weighed, are placed or removed with the greatest facility.

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Okka Weights in Ottoman Palestine

LIONEL HOLLAND

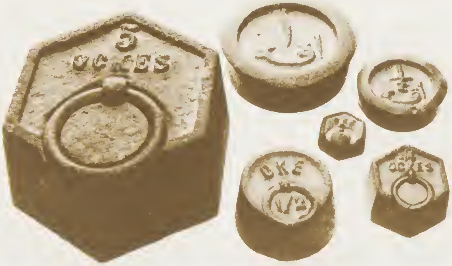


FIG 1. Iron weights marked OCKES or OKE, variations of OKKA.

According to Gibbon, *"The Turks are one of the most numerous families of the world, and almost all the nomad Asian tribes that devastated Europe from the fourth to the twelfth centuries belong to this race - the Huns, Chazars, Avars, Bulgarians, Petchenegues, and Comonians, were all Turks."(1).*

The most recent members of the Turkish family of nations to have an important effect on the history of Europe and the Near East, were the 'Othmanli' or Ottoman Turks (2). During the fourteenth century, this tribe gained ascendancy over the other Turkish clans and tribes in the region. They soon achieved control over all of Asia Minor, and invaded the Balkans. In 1453, the Ottoman Sultan Muhammad II, 'the Conqueror', besieged and captured Constantinople. He called it 'Istanbul' and made it the capital of his kingdom.

At the height of their power, during the 16th and 17th centuries, the Ottoman Turks ruled an empire which included south-eastern Europe, Asia Minor, Armenia, Mesopotamia, Syria, Palestine, Arabia, Egypt, and much of North Africa. During the 18th and 19th centuries, the Ottoman Empire went into decline. It finally broke up after World War I; the last Sultan, Muhammad VI, was deposed and Turkey became a republic.

The Ottoman Turks' original contribution to Near Eastern weights was the Okka (also spelled Oqqa, Ocque, Oke, etc). This was a unit equal to 400 dirhams. In the Arab empire, a dirham (the word is derived from the Greek "drachma") was a silver coin originally weighing about 2.9g. However, by the time the Ottoman Turks arrived on the Middle Eastern scene, the dirham as currency had disappeared. Only its name had survived, applied to a unit of weight. The ponderal dirham is the basic unit of most Islamic weight systems - the common factor, in terms of which all other units are defined (3). In Turkey itself, the dirham had a mass equal to 3.2g. The Ottoman okka, therefore, weighed 1280g.

The Turks introduced the use of the okka to all the regions of their empire where it was used alongside already established units, such as the ratl (4). Any regional variation in the mass of the dirham would, of course, be reflected in a corresponding change in the mass of the local okka. In Egypt, for instance, where the dirham weighed 3.10 to 3.12g, the okka weighed 1240 to 1248g (5).

Ottoman okka weights were characteristically saucer-shaped, usually with a hole in the middle (6). The form is believed to be derived from an even older series of flat disc, or ring-weights, used by the Seljuks (7). These were another Turkish nation who established kingdoms in Persia and Anatolia a few centuries before the Ottomans.

Okka weights were cast in bronze (later, also in brass) in nested sets of seven: 1, 1/2, 1/4, 1/8, 1/16, 1/32 and 1/32 okka. Two specimens are shown in Fig 2. Both of them are regional variants, differing in details of form form the original Turkish pattern described by Pyle (6). The larger is a one-okka weight from 'Akko (Acre) in northern Israel (diam: 148mm, 5.8"; mass 1262g). It is punched with several inscriptions in Arabic: "'Akka" (the city of issue); "Balad" (meaning 'the city authorities'), a verification mark; and, twice, the initials "Beit---Het", for which I have, as yet, no explanation. The weight has no central hole, only a small punched dot. On the convex underside of the weight there are no discernible markings.

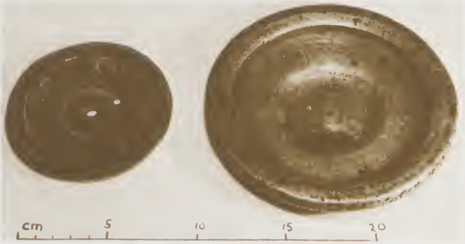


FIG 2. Saucer-shaped OKKA weights for ¼ and 1 Okka. Note the off-centre hole in the smaller one for a lead adjustment plug.

The smaller specimen is a quarter okka (diam: 102mm, 4"; mass 306.4g). Although acquired in Jaffa, its mass tells us that it has been made in accordance with the Egyptian standard (8). Actually, it should weigh a little more - about 310 to 312g. The discrepancy is accounted for by the small off-centre hole, which would originally have been filled with an adjusting-plug of iron or lead (according to Pyle, this was a common feature of these weights). Another distinctive feature of this specimen is the very small central hole - very much smaller than those of the Turkish weights illustrated by Pyle.

During the nineteenth century, European influence in the Middle East became much stronger than previously. Iron weights were introduced, such as those shown in Fig 1. Note the various spellings of Okka. These weights were intended mainly for use by Europeans; we may infer this from the use of Latin, rather than Arabic lettering. Some of them were probably made in Europe; the round half-okka weight has the initials "T.F." stamped into the lead adjusting-plug in its base.

The two stacking weights (marked in Arabic) are of one okka and one-quarter okka, weighing respectively, 1249g and 312g, once again, the Egyptian standard. The lead adjusting-plugs in the bases of these weights are punched with a pious inscription from the Koran, and the numeral "54".

Okka weights of any kind are difficult to find in Israel, and brass saucer-shaped specimens like the ones shown are very uncommon indeed (as they are in Turkey, too); most of them will long since have disappeared into the scrap-founder's furnace. However, in some parts of the former Ottoman empire, they are still in use, and therefore easy to come by. In Cyprus, for instance, the okka, or oke, is still the most important commercial unit of weight (its mass is 1.28kg, the same as the old Ottoman unit). The saucer-shaped brass weights first used by the Ottoman Turks nearly five hundred years ago, can still be seen doing their duty on market stalls of Famagusta and Nicosia.

FOOTNOTES

1. Edward Gibbon: 'The Decline and Fall of the Roman Empire' Everyman's Library edition, Vol.6 p.173, n.1
2. The rise of the Ottoman Turks is described by Gibbon in Chaps.LXIV, LXV.
3. (E.J.Brill): 'The Encyclopedia of Islam' Leyden, 1965. s.v. 'dirham'.
4. Lionel Holland: 'Ratl Weights in Ottoman Palestine' Equilibrium p.907.
5. In 1799, Napoleon's commission of savants established the mass of the Egyptian dirham to be 3.0884g, and in 1845 another commission set by Muhammad 'Ali arrived at the figure 3.0898g ('Journal Asiatique, series 7, No.1 January 1873, p.74). But by the twentieth century, the mass of the dirham seems to have been closer to 3.12g (see Note 3). This inconsistancy probably arises out of the absence of a primary standard in Egypt during that period.
6. Nancy S. Pyle: 'Ottoman Okka Weights' Belleten (Bulletin of the Turkish Historical Society) XLI No.161, January 1977, pp.115-123.

7 Nancy S. Pyle: 'Anatolian Ring Weights' Journal of Turkish Studies (TUBA), Vol.2, 1978, pp.97-106. (Harvard University, Cambridge, Mass). For a short account of the Seljuk Turks, see 'The Shorter Cambridge Medieval History' Cambridge University Press, 1952, Vol.1, pp.278-282.

8. There is nothing strange about Egyptian standard weights having been used in Palestine during the Ottoman period and before. Close commercial ties between the two countries go back to remotest antiquity, and Palestine has often come under Egyptian political domination (most recently, during the 1830s and 40s, in the time of Muhammad 'Ali).

MLS - Steelmar or Bisyard ?

MICHAEL CRAWFORTH

Before looking at the unusual Movable Load Scales (MLS), it seems a good idea to run through the main characteristics of steelyards and bismars, so that the peculiarities of the MLS can best be appreciated.

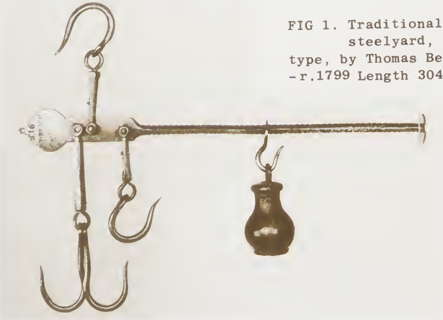


FIG 1. Traditional English steelyard, turn-over type, by Thomas Beach w.1766 -r.1799 Length 304mm (12").

STEELYARDS

A traditional steelyard has a beam with unequal arms, Fig 1. The long arm has a weight (called a poise) suspended from it, which can be moved along the arm until equilibrium is reached. The position of the poise indicates the weight of the load. Essential recognition features of a steelyard are these:- The point from which the load is suspended is at a fixed distance from the main fulcrum, the poise is movable, and the graduations are equally spaced for equal steps in the load. There are many variations on the steelyard principle, but they all have these features in some form or other.

Sheldon's sovereign balance shown in Fig 2 seems to have arms of almost equal length, but this is deceptive. Actually, the length of the arm is the distance from the fulcrum to the suspension point of the poise, and that is variable, so the arms are not equal. But leaving aside this technical point, the reason for this balance having a short 'long arm' is that it was made for only two load values - for the sovereign and the half-sovereign.

A suspended weight is only one of the methods used. The poise often slides on the beam, as shown in the guinea balance by B. Stubbs, Fig 3. Again, the arm is short because there are only two poise positions - for the guinea and half-guinea. At the centre of this balance there is a spring-loaded lever which lifts the knife edge off its bearing to prevent wear. When the lever is depressed the beam is released for weighing. Below the lever there is a swing-out gauge for checking the thickness and diameter of the coins.

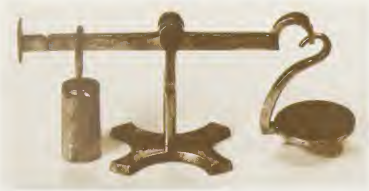


FIG 2. Sovereign steelyard by F.Sheldon, c.1842.

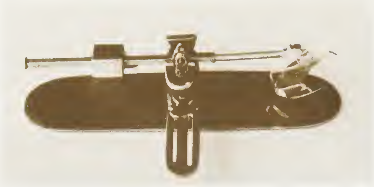


FIG 3. Guinea Steelyard by B. Stubbs, c.1774.

When only two positions are required for the poise, it is possible to use an alternative to sliding the weight. On the sovereign scale shown in Fig 4 the poise was called a 'turn' because it swings over on a hinge from the guinea position to the half-guinea position. A second movable weight slides on the other arm of the beam to measure the loss in weight due to wear on the coin. Please note that this balance still complies with the characteristics of a steelyard. The poise is moved for the weighing process, and the load point is at a fixed distance from the main fulcrum. How the poise moves is of no relevance to the principle of weighing.

Large or awkwardly-shaped loads present a problem with suspended pans, so some steelyards had the load plate above the beam where it was stabilised by a half-roberval linkage - a leg and stay, Fig 5 . Here, any size of parcel can be accommodated within the weighing capacity of the scale. Another variation of this type is shown in Fig 6 where the scale has two beams in parallel. This is simply a way of achieving greater accuracy. The large beam has a poise which is located in steps of one pound up to 7 lb. The small beam has a poise which measures the ounces, 0 - 16 oz. The fact that there are two beams and two poises does not affect the principle of the steelyard.

In this dispensing scale, Fig 7, there is a 'fixed' adjustable counterpoise which can be adjusted to balance the pan. Once the counterpoise has been set it is left alone until a different pan is used. Weighing is done with two poises, the large one positioned in steps of half a drachm up to 8 dr. and working as a normal steelyard poise; that is, it adds to the weighing force as it is moved to counterbalance heavier loads. The small poise is on the load arm of the beam, and at its zero position it is nearest to the load point. In that position it counterbalances part of the main poise. When used for weighing it is moved towards the main fulcrum for increasing amounts of load, that is, it subtracts from its counterbalancing force. This serves the same purpose as the second beam parallel to the main beam shown in Fig 6. Again, how the poises move is incidental to the principle involved. Leaving aside these technical niceties, the important point is that the poises move, and the load point is at a fixed distance from the main fulcrum, so it complies with the steelyard principle.

The dial-poise scale in Fig 8 has a very clever way of moving the poise. By turning the dial to the mark for the desired coin, the poise is moved along a slot in the beam by a rack and pinion, that is, a toothed wheel which engages in a toothed bar. The coin to be weighed is placed against the location pins, so that the position of the load is fixed in relation to the main fulcrum.

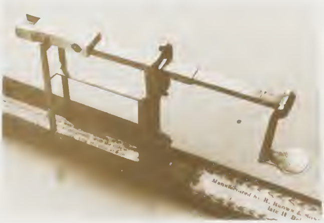


FIG 4. Folding sovereign balance by R.Brown & Sons. c.1830.

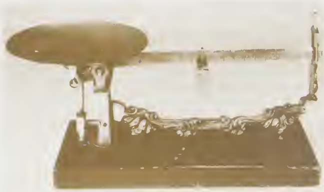


FIG 5. Letter steelyard by an anonymous maker, c.1870

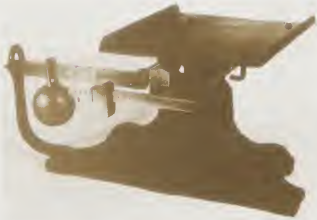


FIG 6. Parcel steelyard patented by C.H.Bartlett of Newcastle on Tyne, England, 27 Apr. 1883.

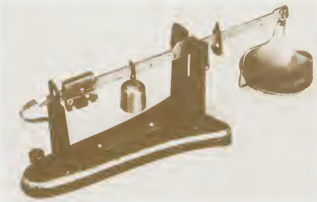


FIG 7. "Prescription scale' by Fairbanks, c.1910.

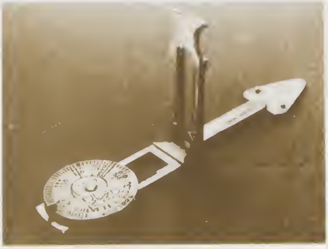


FIG 8. Steelyard with dial-weight for Turkish, Greek and Egyptian coins, late 19th C.

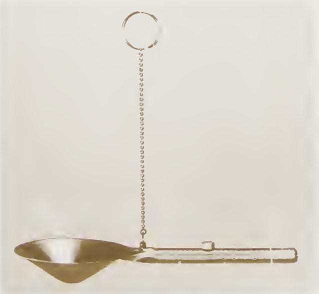
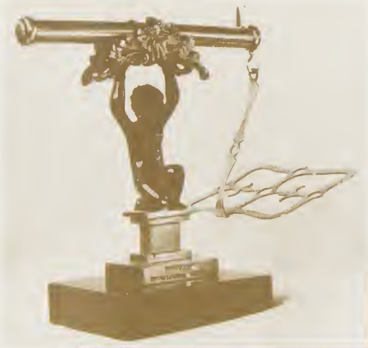


FIG 9. Photographic scale with the poise inside the tubular beam. Made in USA c.1960?

It is not necessary for a poise to be visible. In the photographic weighing spoon, Fig 9, the poise is inside a tubular beam and is moved by the knob which projects through a slot in the beam. Location of the load is achieved, somewhat unreliably, by the chemical powder settling itself in the centre of of the conical bowl. Carrying this poise system a step further, H.B.Wright's letter balance, Fig 10, has a telescopic poise. It starts at zero fully inside the tubular beam, but as it is moved for weighing, the end progressively projects from the end of the beam. A similar arrangement was used on the coin balance by Maranville, Fig 11, which has a flat sheet brass poise.

Perhaps one of the most difficult instruments to identify is the milk scale by Prutscher of Germany, Fig 12. Here, the unwary cataloguer might conclude that it is a bismar, because the fulcrum appears to move along a beam. However, by checking ALL the features, its true principle can be determined. The load point is at a fixed distance from the fulcrum, the graduations are equal in length, and the poise.... well, there isn't one in the conventional sense. Actually, the beam is the short section of tubes connecting the load point to the suspension fulcrum, and the poise is the U-shaped bar that looks like a beam, and which slides through the proper beam. So, this instrument carries the telescopic poise to its ultimate extreme. In working-out the operation of this scale it is necessary to think of the centre of gravity of the U-shaped poise as the active point, and to see that this moves relative to the main fulcrum, just like the suspended poise of a traditional steelyard.



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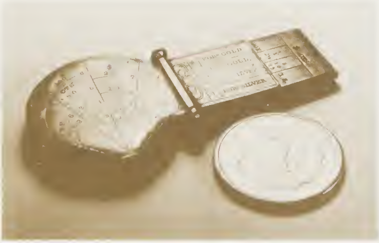

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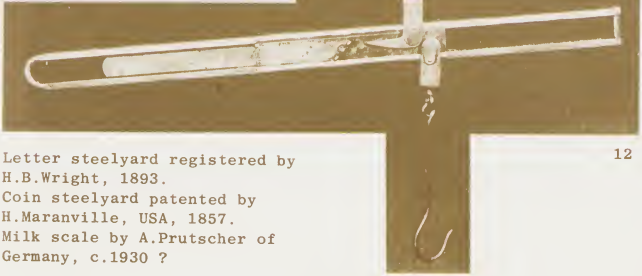

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FIG 10. Letter steelyard registered by H.B.Wright, 1893.
FIG 11. Coin steelyard patented by H.Maranville, USA, 1857.
FIG 12. Milk scale by A.Prutscher of Germany, c.1930 ?

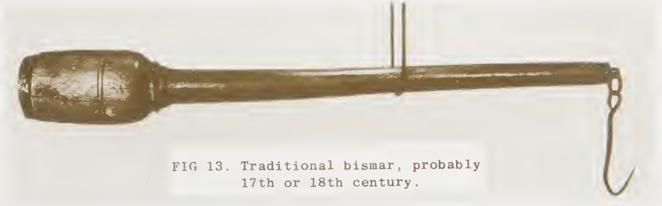


FIG 13. Traditional bismar, probably 17th or 18th century.

BISMARS

A traditional bismar has a poise permanently fixed to one end of the beam, Fig 13. At the other end, the load point is permanently fixed to the beam. On this instrument, the suspension fulcrum is moved to achieve equilibrium, so both arms of the scale are variable. Weight is indicated by the position of the fulcrum along the beam, and the graduations get closer together towards the load point. So, essential recognition features of the bismar are that the poise is at a fixed distance from the load point, the fulcrum can be moved along the beam, and the graduations are unequal for equal steps of load.

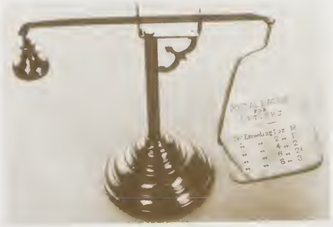


FIG 14. Letter bismar by Samuel Turner Snr. patented by S.W.Suffield 1889. Postage rates for 1871 - 1897. The beam slides through the bearing and guard bracket.

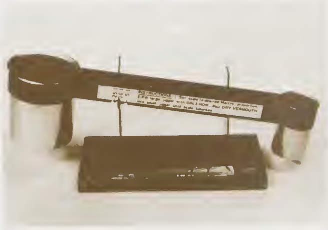


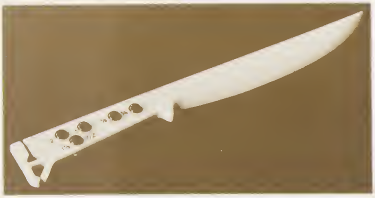
FIG 15. Martini scale for making drinks to specific ratios of gin and vermouth, 25:1, 10:1 or 5:1. Made in USA, anonymous maker.

It is not necessary to suspend a bismar from above. It can be supported equally well from below, as is shown by the letter scale patented by S.W. Suffield, and made by Samuel Turner, Snr. Fig 14. Instead of a poise fixed rigidly to the end of the beam, it has a suspended poise, but the effect is identical. The fulcrum is in the outer limb of the bracket at the top of the pillar, and the inner limb is the guard which prevents excessive swinging of the beam.

Fig 19 shows the bismar at its simplest in the combined rule and letter balance. There is no apparent poise, but the mass of the rule itself works in this capacity and it is necessary to imagine the poise at the centre of gravity of the rule. To use this 'shelf-edge' instrument, it is placed on the edge of a shelf or table so that the edge acts as a fulcrum point. Thus, this balance does comply with the bismar features - the centre of gravity of the rule (the poise) is at a fixed distance from the load point, the fulcrum is moved along the beam, and the graduations are unequal in length.

Another form of fulcrum is shown in Fig 16 where there are five 'finger-pivots'. Instead of moving a single fulcrum to different positions along the beam, there are five alternative pivots which are held between finger and thumb. The effect is identical to moving a single pivot to these positions. Again, the mass of the 'beam' of this combined paper-knife, rule and letter balance, acts as the poise, and the letter clip is fixed relative to the centre of gravity of the beam.

In Hartley's kitchen spoon, the finger pivot had two positions, one at each end of the slot in the 'beam', for one ounce and half-an-ounce, Fig 17. The martini scale shown in Fig 15 has three fulcrum positions giving three different ratios of gin and vermouth - 5:1, 10:1 and 25:1. An unusual aspect of this balance is that the load placed in one jigger (container) becomes the poise for the second load placed in the other jigger. The actual amount put in the first container does not matter, because the ratio will always be the same when the beam balances.



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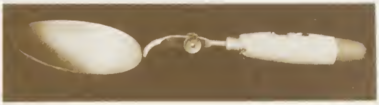

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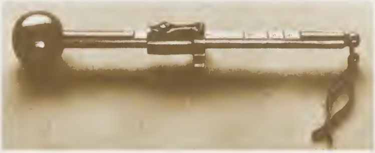
FIG 16. Combined letter bismar, rule and paper-knife. Linex, 1976.
FIG 17. Kitchen weighing spoon, 1oz or ½oz. by Hartley, UK c.1945.
FIG 18. Shelf-edge letter bismar, probably by Greaves, c.1870.
FIG 19. Combined rule and letter bismar Made in USA. c.1970 ?



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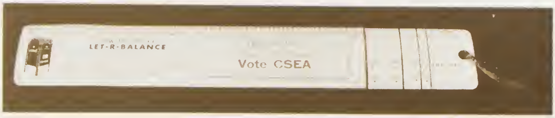

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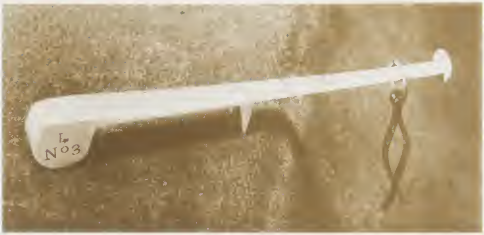

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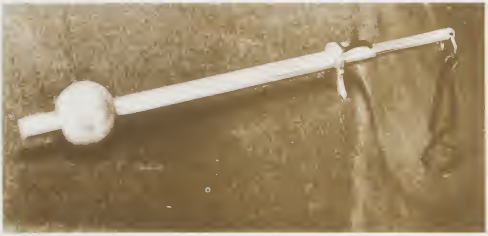
MOVABLE LOAD SCALES - MLS

The title of this article refers to a balance of an unusual principle which seems to have no name. It has some of the characteristics of both steelyard and bismar, yet it is not exactly like either of those instruments. This type of balance is relatively uncommon, although many collectors will be surprised to learn that they have one of its variations in their collections without realizing it. An MLS has a beam with a poise fixed at one end, it has the main fulcrum at a fixed position on the beam, the suspension point for the load is movable, and the graduations get closer together towards the fulcrum. So, the essential recognition features are that the poise is at a fixed distance from the main fulcrum, the load point is movable, and the graduations are unequal for equal steps of load.

A classic MLS is shown in Fig 20 where the fixed fulcrum is in the form of pointed feet which are placed near the edge of a shelf or table. The letter clip is moved along the beam until equilibrium is achieved.



21

FIG 20. Classic shelf-edge MLS, marked L No. 3. Anonymous.

FIG 21. Shelf-edge letter bismar with telescopic beam by Greaves & Son, Sheffield, c.1845.

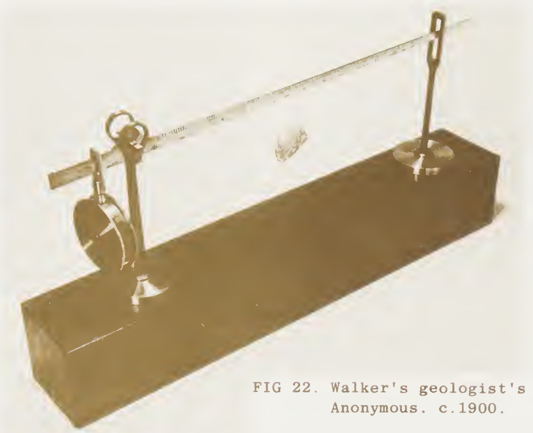


FIG 22. Walker's geologist's balance.
Anonymous. c.1900.

Walker's geologist's balance, Fig 22, is a specialised version of the MLS. The poise is actually movable, but only to enable a large range of rock specimens to be tested. Firstly, the rock sample is suspended from a thin strand of wire somewhere near the middle of the beam. An approximate balance is attained by adjusting the position of the poise, then the poise remains fixed at that position for the rest of the process. Next, the sample is moved carefully along the beam until precise equilibrium is reached, and the number is recorded from the graduations on the beam. Then the rock sample is immersed in water and its position along the beam is adjusted to balance again, taking into account the buoyancy of the rock in water. The new number is read from the graduations and then the specific gravity of the rock can be determined using a simple formula. Note that the graduations are simply convenient numbers and NOT units of weight, consequently, they are equally spaced. Mr. Walker was a famous geologist who invented this instrument, but it was made by several manufacturers.

An MLS which many collectors will have in their collections is the common English sovereign rocker, Fig 23. It has a fixed weight and fixed fulcrum, with two alternative positions for the load - for the sovereign and half-sovereign. Similarly, the more complex balance of William Harris & Co. Fig 25 has six positions for gold and silver coins.

The MLS at its simplest is seen in Fig 24, where there are eight positions for the load, 20, 10, 5, 3, 2½, 1 dollars, 50, 25 cents. Slots for weighing these coins are orientated longitudinally, while lateral slots are for gauging the thickness and diameter of the coins. In this balance, the fulcrum is the right-angle bend in the 'beam', and the poise is that part of the 'beam' behind the fulcrum.

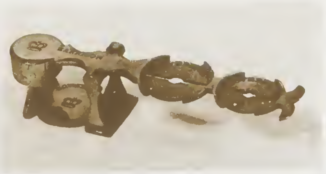


FIG 23. Typical English sovereign rocker by Harrison, c.1830.

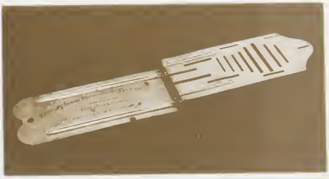


FIG 24. Coin rocker for US coins by Berrian Mfg. Co. N.Y. c.1877.

This Canadian egg balance has the characteristic features of the MLS, Fig 26, fixed poise, fixed fulcrum and four alternative locations for the load, giving 18, 20, 21, and 24 ounces per dozen eggs. These alternative load positions are exactly the equivalent of sliding the load to the same relative distances from the fulcrum. Similarly, the letter balance by William Poupard, (EQM p.621) has three positions for letters, 2,1, and ½ oz.

Less obvious is the shelf-edge balance by Greaves, Fig 21. This instrument has a telescopic beam at the end of which is a letter clip. So, the weight is fixed, the fulcrum is fixed, but the load is moved relative to the fulcrum by extending or retracting the telescopic beam.

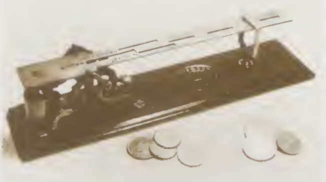


FIG 25. Coin rocker for English coins By Harris & Co. c.1850.

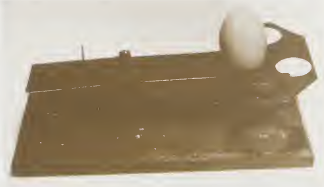


FIG 26. Egg rocker by an unknown Canadian firm. c.1940 ?

An MLS is quickly recognised by the graduations because the heaviest load is near the main fulcrum. However, it is always wise to check all the features to eliminate the possibility of misidentification.

Recognition of Steelyards, Bismars and MLS is greatly assisted by using the Chart, Fig 27. Firstly, see which part is moved relative to the beam when weighing. This will give the answer in the majority of cases. But to be sure, check ALL the other features, too. Which parts are fixed ? Are the graduations equal or unequal ? Do the graduations get closer together towards the load or towards the fulcrum ? If you cannot determine the category your scale fits into, write to the author for help, enclosing a sketch or photograph, and an explanation of which parts move and which parts are fixed, and what the graduations are like. ⊳

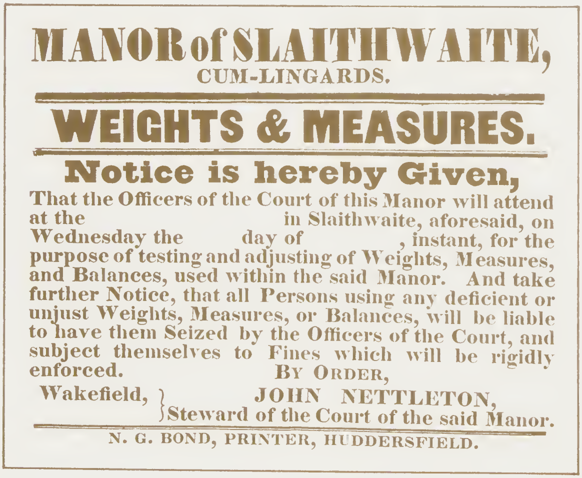
AUTHOR'S NOTE: To simplify explanation of these scales some technical features, like the mass of the beam itself, have been ignored, but the principles are unchanged by these ommissions.

FIG 27 UNEQUAL-ARM BALANCES - RECOGNITION CHART

INSTRUMENT	POISE	FULCRUM	LOAD POINT	GRADUATIONS
STEELYARD	MOVABLE	FIXED	FIXED	EQUAL
BISMAR	FIXED	MOVABLE	FIXED	UNEQUAL closer towards load
MLS	FIXED	FIXED	MOVABLE	UNEQUAL closer towards fulcrum

MLS - STEELMAR OR BISYARD ? is based on lectures given by the author at ISASC's 7th International Convention, Washington, and at the U.K. meeting in Leicester, 1986.

* * *



MANOR of SLAITHWAITE,
CUM-LINGARDS.

WEIGHTS & MEASURES.

Notice is hereby Given,

That the Officers of the Court of this Manor will attend at the in Slaithwaite, aforesaid, on Wednesday the day of , instant, for the purpose of testing and adjusting of Weights, Measures, and Balances, used within the said Manor. And take further Notice, that all Persons using any deficient or unjust Weights, Measures, or Balances, will be liable to have them Seized by the Officers of the Court, and subject themselves to Fines which will be rigidly enforced.

BY ORDER,

Wakefield, JOHN NETTLETON,
Steward of the Court of the said Manor.

N. G. BOND, PRINTER, HUDDERSFIELD.

Public notice with blank spaces for venue and date of inspections.
Sent in by Albert Rangeley.

Letters

POST OFFICE WEIGHTS AND SCALES

May I please comment on the caption to Fig 1, EQM page 581, regarding iron ring weights of the G.P.O. (General Post Office).

The Post Office Act of 1961 gave recognition of the commercial character of the G.P.O. and it ceased to be a Department of the Crown. Prior to this the G.P.O. enjoyed 'Crown immunity' and the Weights and Measures Authorities had no jurisdiction over their scales and weights, although these could be inspected by invitation if necessary, but (if found faulty) no official action could follow.

When the Act came into effect in July, the new Post Office organisation became subject to normal trading requirements whereby scales and weights had to be verified and subsequently inspected, as using scales as a means of ascertaining cost of postage constituted a trading function within the Weights and Measures Acts. Other examples of the definition of 'trade', apart from the selling of goods by weight, include payment of wages for, say, piece work, e.g. coal mining - payment for each tub of coal mined - hence the need for pit bank weighing machines. But I digress - the loss of 'Crown immunity' meant that the scales and weights of the G.P.O. had to conform in pattern as well as accuracy, so this led to the demise of the 8 lb weight which was not permitted by the 1878 Act for trading purposes.

Initially, the need for an 8 lb weight arose because, by adding this to the 7 lb weight it conveniently totalled 15 lb. This was no accident, as the maximum parcel weight was 15 lb, between 1935 and early 1963.

In anticipation of the new Act, new scales and weights were being supplied already verified, before 1961. It is worthy of note that W.& T.Avery Ltd., always keeping abreast of developments, designed a letter scale for the Post Office which was capable of being verified, and resulted in orders for every Post Office in the United Kingdom. This was the type 1107 4 lb capacity dial scale with letter rates for English, Foreign, Commonwealth and Printed Matter, and these scales can be seen in profusion to this day. Orders followed from Commonwealth countries and eventually the scale was released for general sale when the huge demand was satisfied. Geo.Salter & Co. Ltd. obtained orders for their type 40TPO 22 lb capacity parcel scale in large quantities, the 'T' in 40TPO indicating that the machine was verified for trade purposes.

ALBERT RANGELEY

WHAT WILL HAPPEN TO MY COLLECTION ?

Thank you for the article in Equilibrium (p.971) setting out the issues so clearly. One of the difficulties which face a collector - any collector, whether it be scales, stamps, or whatever - is ultimate disposal. Not only is there the aspect of value, but there is also the deeper psychological involvement of the collector with his collection.

You, yourself, have already made the decision to donate some of your more rare pieces to a museum. But...todays' interested curator is often replaced by one who may not have the same attachment, and may not even be aware of the donated treasure which lies beneath his feet.

Selling a collection on the open market may allow some other collector to experience the pleasure of acquiring and handling an object from this endangered species. And a new generation of collectors may thereby be born.

For myself, I would like to think that if we were able to form an English Society of Scale Collectors (I believe that the inclusion of the word 'antique' is a mistake) then the way would be clear for the creation of a charitable body which, with tax-exempt status, could perhaps secure the necessary funds (or support) to enable a 'scale museum' to be founded in the United Kingdom. This then would become a permanent establishment for the display of artefacts; more importantly, it would become a repository for information and research material.

For, surely, it is not only valuable scales that go on death (or disposal), it is the more valuable aspect of knowledge that disappears for ever. I believe that if this could be achieved, there would be another, more desirable option for the serious collector.

BRIAN BRASS (extract).

REPLY

from Michael Crawforth

Your point about creating a repository for research material is a most important aspect of this difficult subject. Certainly, existing public museums cannot be relied upon to make such information available to students, nor to use it much themselves. Publication is the best answer, and is the raison d'etre for Equilibrium, but it is impossible to publish ALL research material - only the cream gets into print.

A major argument against selling an important collection is that the items are likely to be spread among buyers all over the world. Such dispersal has a serious effect on research, because not only are the items no longer together to enable comparisons to be made (a most important aspect of research), but also their very existence is likely to be forgotten. Even if it is known, there are few students who can travel world-wide to collect research material. Also, it is more likely that the historical importance of items made in a particular country will be recognised in the country of origin than in another country.

If items of national historical importance are deposited in a national museum, at least there is the opportunity for a serious student to see them, albeit with inconvenience.

Regarding the formation of an English society; while this has some attractions for an insular nation(one might compare it with the Dutch Society) the potential membership of about forty-five would not even support a decent magazine, never mind the funds for a scale museum. It would still need the wealthy philanthropist I mentioned !

MINT WEIGHTS

At the Royal Mint Exhibition in Leeds Museum I saw a case of twelve weights by L. Oertling, London. The weights were the usual knobbed pattern made of brass with the detachable knob for adjustment purposes. The weights were known as the "Tryer's" weights for the sovereign and were used when cutting the blanks from rolled strips of gold. They would indicate when the roller gap was required to be reduced or increased. The denominations of the weights in grains were as follows:-

123.199 GRN
123.224
123.249
123.274
123.299 GRN
123.324
123.349
123.374
123.399 GRN
123.424
123.449
123.474

It will be noted that the weights differ by 0.025 grain at each step. This type of series could account for some of the odd weight denominations that we encounter and which mystify our members.

As a matter of further interest, a magnificent set of nesting weights in a leather lidded case were also on view. The largest weight was CCLVI Troy ounces (256 oz downwards) and unbelievably, the smallest one was missing. Shades of our experiences. The date was 1707, and the set was known as 'Queen Anne's Pile'.

ALBERT RANGELEY

Showcase

1. Unequal-arm balance for the sovereign and half-sovereign by Heeley & Son. As shown, it weighs the half-sovereign. The weight is placed in the cup at the beam end to weigh the sovereign.
BILL DONIGER COLLECTION

2. Made by an unknown maker for the Badger Fire Extinguisher Company, to weigh CO_2 cartridges.
JOHN CATTLE SNR. COLLECTION

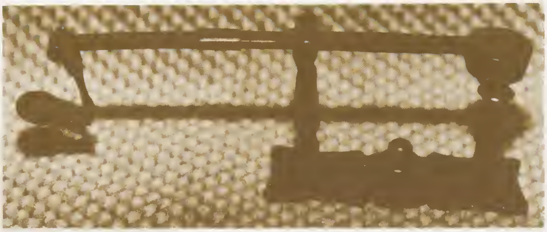
3. "Dr. C.H.Fitch's Prescription Scale. Patd. Sept.29 1885. Manuf'd by N.V.Randolph & Co. Richmond VA."
JERRY KATZ COLLECTION

4. Left: "The Feed That Never Varies LARRO Every Sack Identically the Same. Chas. Forschner & Sons Inc. New Britain, Conn. To weigh 50lb by 10ths. Each 20lbs is marked on the slide, the intermediate weights on the circle. Made in USA."
Right: "COW CHOW Makes More Milk at Less Cost. Don't Guess - Use this PURINA MILK SCALE."
MARVIN MILLER COLLECTION

5. Heavy duty box scale by the "Western Scale Works Chicago Il."
JOHN CATTLE SNR. COLLECTION

SHOWCASE

1



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English Coin-Weights 6

NORMAN BIGGS

THE NEWTONIAN PERIOD

In 1663, soon after the restoration of the monarchy, Charles II authorised the issue of new gold coins valued at 20 shillings and weighing 131½ grains (reduced to 129½ grains in 1670). These coins were made by machinery and their edges were grained, so the problem of clipping could not arise. They soon became known as guineas because the gold they contained came from Guinea in Africa. Many of the old Jacobus and Carolus coins of 155 grains and 140 grains remained in circulation, although those pieces coined during the Commonwealth were quickly demonetised.

The earliest weights belonging to this period are very rare and rather enigmatic. The obverse shows the title and bust of Charles II, but the reverse is the old pre-Commonwealth type with a crown surmounting the value in Roman numerals. A piece bearing the value XXs is shown in Fig 2, and a piece bearing the value Xs is shown in Fig 3. These are the only known types. It is commonly thought that these pieces were intended for weighing the guinea and half-guinea, and their weights tend to support that view, although it must be said that very few of them exist and some, at least, show signs of having been filed down. Thus, the possibility that they were intended for weighing the Carolus cannot be ruled out.

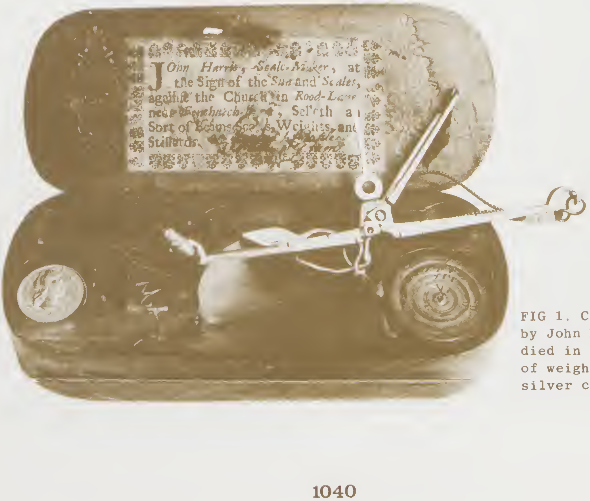

John Harris, Scale-Maker, at
the Sign of the Sun and Scales,
against the Church in Rood-Lane
near Fenchurch, Selleth a
Sort of Beams, Weights, and
Stillards.

FIG 1. Coin scales by John Harris who died in 1699. Nest of weights for four silver coins.

Weights bearing the title and bust of James II (1685-1688) are scarce, but by no means as rare as those of Charles II. There are two major types, one with large lettering and a poor portrait, Fig 4, and one with smaller lettering and a finer portrait (Part I, Fig 7). Once again, these pieces have the old reverse type. They bear values XXIIs, XXs, XIs, Xs, and examination of their weights proves conclusively that they were intended for the Jacobus and Carolus and their halves. There is also a type whose obverse bears no legend, and a portrait which has been claimed variously to be a representation of every ruler from Cromwell to George I, Fig 5. Whoever he may be, the style of these pieces places them clearly in the Charles II and James II group of weights.

Around this time, the poor state of the silver coins in circulation began to cause serious difficulties. Silver was still the nominal standard of value, but the silver coins were so worn and clipped that their silver content bore no relation to their face value. It had become customary to give a premium in silver when it was exchanged for gold, and the value of the guinea had risen accordingly. In the period 1690 to 1695, it rose alarmingly and eventually a Great Recoinage of silver was decided upon, but the guinea had risen to 30 shillings before the measure took effect.

It is probable that the variability of exchange rates at this time was one factor in the emergence of a new series of coin-weights. Another factor was the fact that some of the guineas had been in circulation for thirty years and must have been showing signs of wear, and yet another factor was the practice of "culling", of which more will be said in due course. The earliest of the new weights bore the conjoined busts of William and Mary (1689-1695) on the obverse, while the reverse was a new and distinctive type. The large crown of the old style was retained, but it was now superimposed on a pair of crossed sceptres, and below it appeared the legend I GVINEA W in three lines, Fig 6.

There are several varieties of William and Mary guinea weights, and very many more bearing the bust of William alone (1695-1702). There are variations in the style of the portrait and in the obverse legend; the spelling GVENEA occurs on several types, Fig 7, and one type has the bust facing left instead of right, Fig 8. Descriptions of most of the known types are given by Sheppard and Musham (4), and several of them are shown in the EQUILIBRIUM article *Guinea Weights* by Ronald Stocks (27).

But the guinea weights tell only half the story of the production of English coin-weights in the later 1690s. At that time the French gold louis d'or circulated extensively in England, where it was commonly known as a pistole. The usual 'set' of gold weights thus comprised four weights, for the guinea, half-guinea, pistole and half-pistole. The latter weights normally carried the bust and titles of Louis XIV on their obverse, while the reverse bore three fleurs-de-lis above the legend I PISTOL W in three lines, Fig 9. In some cases, it is possible to identify the guinea and pistole weights from the same set by careful scrutiny of the details of the design, but often this cannot be done conclusively. For that reason the guinea-weights and pistole-weights, in the main, will be assigned to separate subgroups of the classification scheme, leaving open the possibility that further study may restore the proper unity. A few types bear the initials of the maker alongside the portrait of William or Louis, and in these cases it is clear that the set of four weights can be identified, Figs 10-13.

At this point, the reader may be wondering why the name Newtonian Period should be associated with this era of English coin-weights. It is well known that the great mathematician Sir Isaac Newton was appointed Warden of the Royal Mint in 1696, and Master in 1699, but it is often thought that his Mint appointments were mere sinecures. This view is comprehensively rebutted in the book *Newton at the Mint* by Sir John Craig (26). Most relevant to our theme is Newton's work on two particularly difficult questions: the 'correct value' for gold coins, and the problem of culling.

The rising value of the guinea has already been mentioned. In 1696, at the time of the Great Recoinage of silver, Parliament acted to limit the value to 28s, then 26s and then 22s. On 16 February 1699, it was reduced to 21s 6d. Newton was concerned to establish the correct relative values for the pistole and the guinea, and to that end he made careful assays and calculations. His conclusion was that the pistole was worth only 17s, as opposed to the 17s 6d for which it normally changed hands. His view prevailed, and the pistole was devalued by a Proclamation dated 5 Feb. 1701. His next conclusion, that the guinea was itself overvalued, was stalled by the Treasury with the request that a more thorough investigation be made, and in response Newton embarked upon a series of extensive calculations, involving the gold/silver ratio in many countries. His report, proving that the guinea was indeed overvalued, was set aside by the Treasury in 1702, but fifteen years later his opinion was sought again, and the guinea was reduced to its now traditional value of 21s. Clearly, Newton's insistence on correct values for gold coins helped to establish a stable currency, and thus reduced the demand for coin-weights.

Equally influential were his measures against culling: the practice of picking out slightly overweight coins and returning them to the Mint as bullion to be recoined. This was nothing new; it had been proclaimed against in 1627 (14, p.145), but in the 1690s it was still carried out on a massive scale, by goldsmiths in particular. It was possible because the Mint was legally obliged to make coins only by average weight - so many guineas from so many ounces of gold. There were some controls over the weights of individual pieces, but they were not nearly stringent enough. Newton himself, estimated that at least one-eighth of the Mint's output was returned immediately as 'come-again guineas', and the goldsmiths thereby made a handsome profit at public expense. Soon after he became Master, in 1699, Newton acted to impose stricter standards on the individual coins, and thereafter the problem of culling faded away.

Newton's contribution to the story of English coin-weights was thus a negative one. It might be expected that his reforms would lead to a decline in the production of coin-weights, and indeed that was the case. Weights bearing the portrait of Queen Anne (1702-1714) are much scarcer than those of William, there being only two types known, Fig 14 and Part 1, Fig 12. It appears that many makers who had been producing weights with the portrait of William did not trouble to prepare new portraits after the succession of Anne, preferring instead to put their own names on the obverse of their weights. Among the makers who did this were Thomas Garratt, Anthony Giles Fig 15, William Hayward, Samuel Kerrison, Richard Litchfeild Part 1, Fig 11, John Plat, Thomas Peirson, and John Wade. But all these pieces are very scarce, and the general impression is that production declined rapidly after 1702.

There is one other group of weights belonging to this period. As we have seen, the silver coins were at the root of the currency problems of the late 17th century, and so it is no surprise that coin-weights were used for checking them. Some of the scarce Group D weights issued under Charles I were undoubtedly still in use, but there are also some simpler weights found in scale boxes of this period. They bear only a stamp indicating the denomination: SV for the crown, Part 2, Fig 14, XXXD for the half-crown Fig 16, XIID for the shilling, and VI D for the sixpence. A particularly rare type is a set of nested weights, which is definitely attributable to this period, because scale boxes with a special recess for nesting weights are known, Fig 1. In addition, there are some simple flat weights for the pistole and half-pistole, Fig 17, bearing the stamps 1 (or ½), P, F, and a fleur-de-lis. Because they are similar in style to the flat silver weights, and because the French pistole was current in England only at this time, it seems likely that such weights belong to this group.

Finally, it must be remarked that the practice of putting an official stamp, or verification mark, on coin-weights was revived towards the end of this period. The Charter of the Founder's Company (Guild) granted by James I in 1614 confirmed their authority to stamp brass weights, sold or used in London, with a ewer, commonly called a coffee-pot (25). Apparently, this mark was not used on coin-weights until around 1700. Almost all the weights with the maker's name in full on the obverse are stamped with a ewer, Fig 15, and a few of those with the royal portrait are also so marked. But this was a short-lived flirtation with officialdom, and verification marks do not re-appear on coin-weights until 1774.

CLASSIFICATION - see page 1046.

ILLUSTRATIONS

2. Obv. CAROLVS ·II· REX around bust of Charles II facing left. Rev. crown ·XX· ·S· 125gr. 20mm. c.1680? For the guinea or Carolus (see text).
3. Obv. CAROLVS ·II· REX around bust of Charles II facing left. Rev. crown ·X· S. 62gr. 17mm. c.1680? For the half-guinea or half-Carolus (see text).
4. Obv. IACOBVS·II·REX around bust of James II facing right. Rev. crown over XXII (II added incuse) ·S· 153gr. 20mm. c.1685. For the unite of James I, second coinage (1604-1619). 155gr, valued at 23s 6d in 1661, although still known as a 'twenty-two shillings piece', or Jacobus.
5. Obv. no legend, unidentified bust facing right. Rev. crown over XX s. 140gr. 20mm. c.1685? For the Carolus, 140gr, valued at 21s 4d in 1661, although still known as a 'twenty-shilling piece'.

6. Obv. GVLIELMVS·ET·MARIA·REX around conjoined busts of William and Mary facing right, two small crosses below. Rev. crown superimposed on crossed sceptres, I GVINEA W in three lines. 129gr. 20mm. c.1690. For the guinea, 129½gr, current value variable at this time.

7. Obv. GVLIELMVS·III·DEI·GRA·REX around bust of William III facing right. Rev. crown on sceptres, I GVENEA W. 129gr. 20mm. c.1700. For the guinea as No.6.

8. Obv. GVLIEMVS·III·DEI·GRATIA around bust of William III facing left. Rev. crown on sceptres, GVINEA W. 62gr. 17mm. c.1700. For the half-guinea, current value variable at this time.

9. Obv. LVD·XIIII·D·G· FR·ET·NAV·REX around bust of Louis XIV facing right, mullet below. Rev. three fleurs-de-lis, I PISTOL W. 104gr. 19mm. c.1700 For the French Louis s'or, 104gr, current for 17s 6d until 1701, and 17s thereafter.

10. Obv. GVLIELMVS·III DEI·GRATIA·REX around bust of William III facing right, crowned AG alongside neck, four dots below. Rev. crown on sceptres, I GVINEA W. 129gr. 21mm, c.1700. For the guinea, as No.6.

11. Obv.GVLIELMVS III DEI GRA REX around bust of William III facing right, crowned AG alongside neck. Rev. crown on sceptres, ½ GVIИEA W. 65gr. 17mm, c.1700. For the half-guinea, as No.7.

12. Obv. LVD XIIII D G FR ET NA REX around bust of Louis XIV facing right, crowned AG alongside neck. Rev. three fleurs-de-lis, I PISTOL W. 105gr. 19mm. c.1700. For the French Louis d'or, as No.9.

13. Obv. similar to No.11. Rev. three fleurs-de-lis, ½ PISTOL W. 52gr. 17mm. c.1700. For the French half Louis d'or, current for 8s 9d until 1701, and 8s 6d thereafter.

14. Obv. ANNA·DEI· GRATIA· around bust of Anne facing left. Rev. crown on sceptres, I GVINEA W. 128gr. 21mm. c.1702. For the guinea, valued at 21s 6d from 1699.

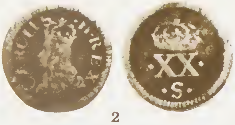
15. Obv. AИTHOИY GILES in two lines, rose between two dots below, stamped ewer. Rev. crown on sceptres, I GVINEA W. 128gr. 20mm. c.1705. For the guinea, as No.14.

16. Obv. stamped D XXX. Rev. similar. 228gr. 24mm. c.1700? For the silver half-crown from 1601, 232 gr.

17. Obv. stamped ½ P F and fleur-de-lis. Rev. similar. 52gr. 16mm. c.1700. For the half-pistole, as No.13.

REFERENCES References 1-4 are in Part 1; 5-10 in Part 3; 11-19 in Part 4; and 20-24 in Part 5.

25 CHANEY H.J.: 'Our Weights and Measures' Eyre & Spottiswoode, London, 1897.
26 CRAIG Sir John: 'Newton at the Mint' Cambridge University Press, 1946.
27 STOCKS Ronald: 'Guinea Weights (Part 1)' Equilibrium, pp459-467.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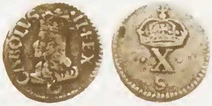
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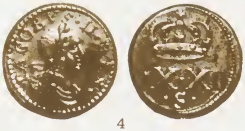
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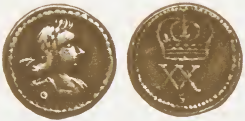
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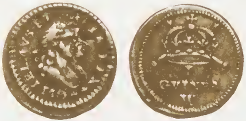
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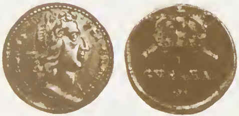
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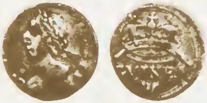
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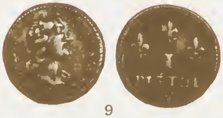
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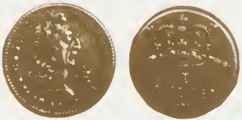
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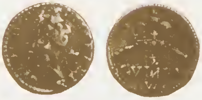
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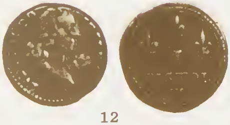
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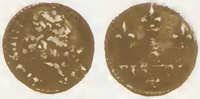
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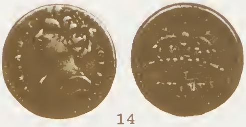
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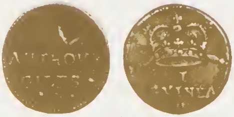
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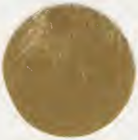
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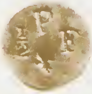
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CLASSIFICATION

There are three distinct groups belonging to the Newtonian period:

GROUP E	Weights with the reverse type resembling Group C, and with a portrait of Charles II or James II.
Subgroup E1	Charles II types, Figs 2 & 3.
Subgroup E2	James II types, Fig 4.
Subgroup E3	Unattributed types, Fig 5.
GROUP F	Weights for guineas and pistoles, issued under William & Mary, William, and Anne.
Subgroup F1	William & Mary types, guineas, Fig 6.
Subgroup F2a	William III types, guineas, Figs 7 & 8.
Subgroup F2b	Louis XIV types, pistoles, Fig 9.
Subgroup F3	Regal portrait types with maker's initials, guineas and pistoles, Figs 10 to 13.
Subgroup F4	Types with maker's name on obverse, guineas and pistoles, Fig 15.
Subgroup F5	Queen Anne types, guineas, Fig 14.
GROUP G	Weights for silver coins and pistoles bearing only a stamped indication of denomination.
Subgroup G1	Weights for silver coins, Fig 16.
Subgroup G2	Weights for pistoles, Fig 17.

Notes & Queries

NQ 96 PRODEVEL WEIGHTS

note from Maurice Stevenson

I finally solved an early query to Libra (magazine of the Weights & Measures Administration History Circle, now defunct) on PRODEVEL weights. While on holiday in the West Country, last Autumn, I saw a set of these weights for sale along with their original scale which was a roberval-type counter machine. On the casing of the scale was a circle inscribed "Prodeval Domestic Scale Co. B'ham". So, it appears they only manufactured domestic scales and weights.

REPLY

from the Editor

It is nice to have this mystery solved after so many years. Armed with your information, I searched the Birmingham trade directories but found no reference to the Prodevel Domestic Scale Co. However, the name is so unusual that it must surely be connected with "Prodevel; production engineers" of 56 Frederick St. Birmingham, in directories from 1947 to 1951.

NQ 97 FIRST U.S. POSTAL SCALE note from Sonny Ifshin

It took a bit of time, but I finally received a response from the Postal Service (about early Post Office scales). The main points are as follows:

The legislation to which you are referring is probably the Act of Congress of March 3, 1863, which created a uniform rate of postage regardless of distance, and set up weight as the primary means by which to determine postage for first class mail - (and created the need for scales).

A study of the early rates, however, reveals that weight had been used in part for rating letters prior to 1789 for first class mail and as early as 1845 for magazines and newspapers (later second class mail).

Unfortunately, copies of the original bids submitted for scales (for the Post Office contract) during these periods (through 1863) are not now in the possession of the Postal Service. Our records do show, however, several references to the early use of scales by the Post Office Department.

For instance, in the first Cash Book (1789-1796), it is noted that on March 15, 1794, the sum of $3 was paid to Jacob Tyson for "3 setts Brass Weights" and $6.33 was paid to Ellis Yarnell for one dozen scale beams". In addition, on April 15, 1794, Benjamin Haberson was paid $4 for making 12 scales for the use of the general post office.

Our records also show that two letters were written by Postmaster General Cave Johnson concerning scales. One was addressed on May 1, 1845, to Charles E. Townsend Esq., care of J.& C.Townsend, 90 Broad St, New York:- "I have to acknowledge the receipt of your letter and the package containing the model of a balance therein referred in. Your letter is filed among other proposals to furnish balances for this Department, and will receive due consideration."

Since many records have been transferred to the National Archives and Records Administration, NNFJ, Washington, D.C. 20408-0001, you may also wish to write that agency for any additional information they may have on early use of scales by the Postal Service.

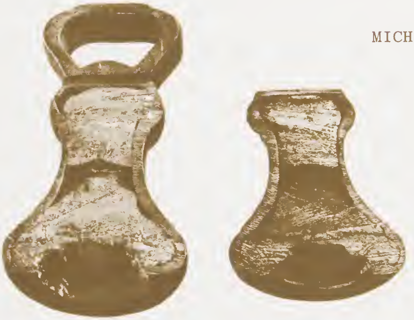
COMMENT from the Editor

This is most important information showing the early use of scales for some types of mail in the 18th century! The universal use of scales by the U.S. Post Office, starting in the 1860s, still needs investigation - which were the seven (?) scale companies which tendered for the contract ? And what types of scale did they offer ?

Can some American member take up this research with the National Archives & Records Administration in Washington ?

Anatomy of a Cased Weight

MICHAEL CRAWFORTH



This 19th century bell weight has an outer casing of brass and a central core of lead. The imperfect shape of the filling shows that the lead was poured into the cavity in two lots, leaving an unintentional gap between them. The large opening through which the lead was poured provides easy access for fraudulent removal of the lead without disturbing the verification stamp. Marks can be seen on the left side where this appears to have happened.

Weights of this type, consisting largely of lead inside a harder metal case were called CASED weights. They probably became popular as a consequence of the Weights and Measures Act of 1834 which prohibited the use of all-lead weights for trade purposes *"no Weight made of Lead or of Pewter shall be stamped or used"*. Lead weights had been used, previously, for many centuries because they were cheap and easy to make, but, of course, the soft metal was subject to rapid wear and consequent loss of weight. Encasing the lead in a harder metal must have seemed a good solution - using cheap material for the larger part and hard-wearing material for the exterior. But it seems that there were still unacceptable disadvantages, because the Weights and Measures Act of 1890 prohibited cased weights, too, for trade use. *"No lead weights, although cased in brass or other metal, shall be stamped"*. However, iron weights cased in brass WERE permitted for trade, provided that they were marked 'CASED'.

Photograph courtesy John Cheeseman.

Has any member ever seen an iron weight cased in brass ???

ISASC

EQUILIBRIUM

QUARTERLY MAGAZINE OF THE INTERNATIONAL SOCIETY OF ANTIQUE SCALE COLLECTORS

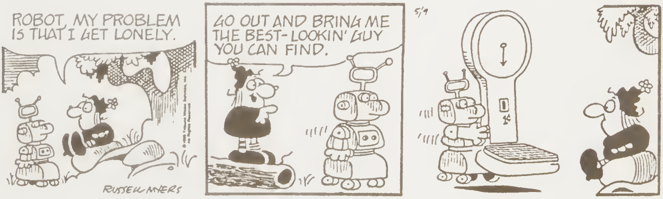
1987-ISSUE NO. 4

PAGES 1049-1076

Cover Picture

This charming little postal scale is 110mm tall (4¼"), and made of sterling silver on an ebonised wood base. The floral design was made in three sections so that the flowers could be raised in exceptionally high relief for a semi-globular design. The internal mechanism used a system which was (as far as is known) not used in Europe for postal scales:- the half-roberval and spring with a rack and pinion driving a horizontal cylinder. This rotating drum was graduated with postage rates in cents for Papers, Books, Merchandise and Letters. It was made in the USA and is marked 'Gorham B.2669 Patented 1904'. The Gorham Company were silversmiths in Providence, Rhode Island.

Betty Wright Collection.


ROBOT, MY PROBLEM IS THAT I GET LONELY.
RUSSELL MYERS
GO OUT AND BRING ME THE BEST-LOOKIN' GUY YOU CAN FIND.
5/9
1¢

Russell Myers' cartoon is reproduced by courtesy of the owner, Betty Wright.

INTERNATIONAL SOCIETY OF ANTIQUE SCALE COLLECTORS

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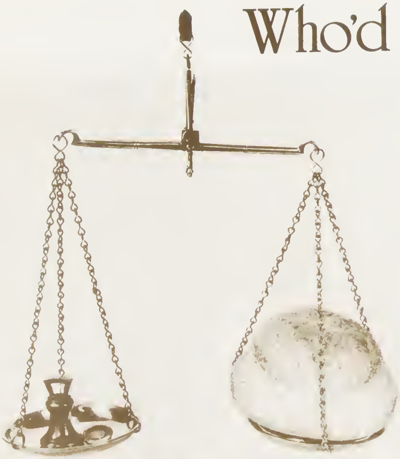


Who'd be a Baker?

Bread-Weighing in Britain 1266-1926

Part 1

DIANA CRAWFORTH

"A baker nailed by his ears to his own door..." his only offence having been to sell one light-weight loaf in Cairo in the 19th century. British law would not have been so punitive. Even in the Middle Ages, such an offender would have been sentenced to a day in the pillory - uncomfortable, degrading, and smelly, but not as bad as the Moslem punishment.

Whether in Cairo in the 19th century, or in Britain in the Middle Ages, customers felt strongly about bakers who cheated them. Bread was the major part of their diet, and they wanted value for money.

So, what did the customer expect in, say, 1266? He paid a farthing for a loaf, a farthing being a fourth of a penny. The rich bought the best, called 'wastel bread' - little loaves of fine white flour, at a farthing each. The well-off could afford the good quality 'wheaten bread' - brown loaves which were slightly bigger, for a farthing. The working man probably bought 'household bread' - rough brown loaves, which had some rye or oats in them, and were bigger still, for a farthing. But the numerous poor used their farthing to buy 'horsebread' - a large loaf made of barley or rye mixed with bran from the wheat milling, and with pease and malt added. Of course, the neighbours commented when they came home with the despised 'horsebread', but nutritionalists today would applaud such a loaf, high in protein and roughage.

Nobody could buy fancy bread with sugar, currants or spice in it unless he had a special dispensation for a burial or a holy day such as Good Friday. This was part of the law because the Rulers considered that the precious wheat would be used up too quickly if such extravagances were permitted.

BREAD VARIATIONS SOLD THROUGHOUT THE YEAR

OLD NAMES	MODERN EQUIVALENT	RATIO OF WEIGHT
Wastel, Manchet, Pain demaigne, Blan peyn, Pouf, White.	Fine white	If Wastel weighed $6\frac{16}{20}$ lb
Wheaten, Cocket	Fine brown	then Wheaten weighed $7\frac{1}{20}$ lb
Household, Cheat, Common wheat.	Coarse brown + barley, rye or oats.	Household weighed $10\frac{11}{20}$ lb
Horsebread.	Barley, rye + bran Malt and pease or beans.	Horsebread weighed $14\frac{2}{20}$ lb

Two other types of bread occur in the literature of the period - trencher and bread of Treat. Trencher bread was cut into large flat pieces and put on the table where we would put a plate. Food was either put on the trencher, or eaten over the trencher, so that all the juices were absorbed by it, then the trencher was eaten by the hungry (the "good trencher man"), given to the beggars, or thrown to the dogs. As the author found no law relating to this bread, it may have been the horsebread already mentioned, or it may have been bread baked at home and consequently outside the law. Bread of Treat was a course boiled bread, presumably cooked as we boil a pudding in a cloth, dropped into the cauldron beside the pig's head and the cabbage.

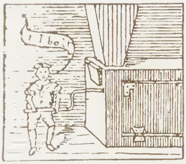
Obviously, the vast majority of the population lived out in the country and were not affected by the laws relating to bread, unless they came to market and indulged in some bought bread as a luxury. But families did live basically on a diet of bread or oatmeal and the cost of grain was probably a major subject of conversation throughout their lives. ▷

SPECIAL VARIATIONS

OLD NAMES	MODERN EQUIVALENT	RATIO OF WEIGHT
Simnel, Easter, Demesne, Pain dominicus.	Fine white, sweetened or spiced	If Wastel weighed $6\frac{16}{20}$ lb then Simnel weighed $6\frac{14}{20}$ lb
Tourte	Trencher	-
Bread of Treat	Coarse, boiled	Treat weighed $13\frac{12}{20}$

THE MYSTERIE AND TRADE OF BAKING

All services that to the Baker's Trade
Or mysterie belong, be here displaid,



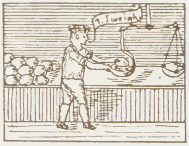
Which my rude Arts in order shall recount,
And those in number to thirteen amount,
Being (how ere such Tradesmen used to coozen
In their scale measure) just a Baker's dozen.

First Boulting, Seasoning, Casting up, and Braking,
Breaking out dowe, next Weighing, or weight making
(Which last is rarely seene), then some doe Mould;
This Cuts, that Seales and Sets up, yet behold

The seasoner Heating, or with Barin fires
Preparing the oven as the case requires;
One carrying up, the Heeter peeleth on
And playes the Setter, who's no sooner gone

But the hot mouth is Stopt, so to remaine
Untill the setter drawes all forth againe.
Thus bakers make and to perfection bring,
No less to serve the Beggar than the King,

*



All sorts of Bread, which being handled well,
All other food and Cates doth farre excell.
Let Butchers, Poultrers, Fishmongers contend
Each in his own trade, in what he can Defend,

Though Flesh, Fish, Whitemeat, all in fitting season,
Nourish the body, being used with reason,
Yet no man can deny (to end the strife)
Bread is worth all, being the staff of life.

* This woodcut 'I Weigh' illustrated John Penkethman's 'Artachthos' published in 1638. It is the earliest picture, known to the author, of a cranked hanger and pan, and clearly shows easy access to the pan.

If wheat was cheap, a farthing loaf of horsebread would weigh perhaps 7½ lb Troy, and would feed an adult for a week, and a farthing loaf of fine white bread would weigh perhaps 3 3/4 lb Troy and feed one adult for three or four days. When the wheat crop was reasonable, a working man could probably buy enough bread for himself for a week using a quarter of his wages, but if wheat was expensive, or the man was doing seasonal work, or if he had a large family, he had problems. A quarter of his weekly wage would buy one tiny loaf, enough for himself alone for one meal only.

Who decided how much a farthing loaf weighed? The baker had no choice in the matter. It was controlled by law:- the Assize of Bread, with inspectors in every market, and with local authorities specifying the weight of a farthing loaf according to the price of wheat in their area. The London Assize was carefully decided by four lawful and honest men who had to buy wheat, grind it, bake it and calculate the appropriate weight to allow a baker his profit. The baker could only change the weight of his loaves when the price of a quarter of wheat had risen or fallen a full 6d.

In 1266 the law stated that the baker was to buy his quarter of wheat (about 400 lb Avoir, or 2½ sacks), add the cost of his expenses, add a profit of 4d for himself, then divide the dough into exactly the number of farthing loaves which would pay for it all. So, supposing wheat was 12d a quarter, he added costs of:-

3 servants (i.e. workmen)	1½ d	Fuel	2 d
2 lads	½	Sieving	½
Salt	½		5 3/4 d
Yeast	½	Profit	+ 4
Candles	¼		9 3/4 d
		Wheat	+12
		TOTAL	21 3/4 d

He was allowed to bake two loaves for his family, so he divided the resulting dough into 89 loaves and sold 87 loaves at a farthing each, or 21 3/4d.

But what if wheat grew badly that year, and was scarce? The baker might have to pay 240d for a quarter of wheat, to which he added his expenses of 5 3/4 d and his profit of 4d, making a total of 249 3/4d. He divided his dough into 1001 loaves and sold 999 of them at a farthing each.

This seems fairly straight-forward, but of course, the baker did not make all the loaves out of wheat flour, so he had the cost of rye and barley to consider (half the price of wheat) oatmeal (at a quarter the price of wheat), pease and malt. He was still restricted to a profit of 4d, but calculating the size of each loaf must have been horrendous. No wonder bakers fell foul of the law!

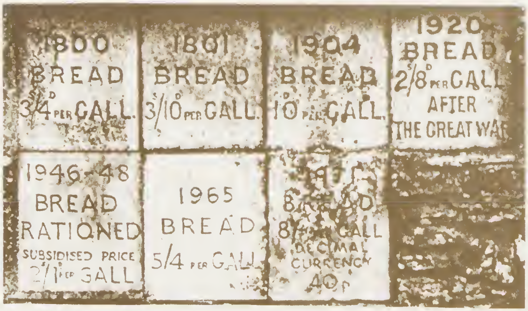
If a loaf was only marginally under weight, he paid a fine, if it was grossly underweight he was put in the pillory for a day, and for three offences he was pilloried, flogged, and dragged round behind a tumbrel

ASSIZE OF BREAD		
When the price of wheat per quarter was:-	a ¼d loaf of best white flour weighed	a ¼d loaf of household brown weighed
12d (or 1s)	5 lb 8 oz	8 lb 8 oz
60d (or 5s)	1 lb 5 oz	2 lb
180d (or 15s)	5¼ oz	7½ oz
240d (or 20s or £1)	3 3/4 oz	5 oz

(cart) so that the public could throw nasty things at him, his ovens were destroyed and he was no longer allowed to be a baker.

For those amongst the readers who are interested in accuracy, the weight of the loaf was commonly expressed in terms of the Troy pound divided into 20 shillings or 240 pennies. So, the 'weight' of the 1 lb 5 oz loaf was expressed as £1.7s.2½d between the years 1266 and 1527.

Problems arise today from the difficulty of defining the 'quarter' used in the Middle Ages. Were they using the quarter based on 8 x 8 gallons of wine, or 8 x 8 gallons of wheat, and was that gallon based on Troy pounds, Tower pounds, the Libra Mercatoria or Avoirdupois pounds? Probably they were using the gallon of about 224 cubic inches, in London, which is about 20% smaller than a modern British gallon, but many other 'gallons' were used in other parts of England. So, any estimates of what the baker used are very approximate... ▷


1800 BREAD 3/4 PER GALL.
1801 BREAD 3/10 PER GALL.
1904 BREAD 10 PER GALL.
1920 BREAD 2/8 PER GALL AFTER THE GREAT WAR
1946-48 BREAD RATIONED SUBSIDISED PRICE 2/1 PER GALL
1965 BREAD 5/4 PER GALL
BREAD PER GALL DECIMAL CURRENCY 40p

The wall of Wishford Church, Wiltshire. The scandalised parishioners recorded for posterity the enormous price they had to pay for a 'gallon' loaf (that is a half peck loaf weighing 8 lb 11 oz) in 1800 and 1801. They must have given thanks in 1904 that they only had to pay 10d. Foreigners may be surprised that bread was rationed *after* World War II, but this was because the USA insisted on Britain repaying her war debts immediately, leaving us too little money to buy wheat from abroad.

Quartern and half-quartern weights. The mass of 4lb 5oz 8dr and 2lb 2oz 12dr, shows that these weights were for weighing baked loaves between 1757 and 1836 in England and Wales (1757-1822 in London). Such accurate and handsome weights would probably have been used by one of the authorities who had the power to check bakers' products.

At the time the laws were in force, both the baker and the market inspectors knew exactly how much a £1.7s.2½d weight was, and the customers knew roughly how much bread they were entitled to that week. The authorities were quick to enforce the law. In fact, they were too quick sometimes - they left so little margin for profit that bakers stopped baking and a black market developed, with illicit bakers working outside the jurisdiction of the authorities. This was even more detrimental to the poor townsfolk, who did not know what weight their black market loaf was, or what was in it, yet had to buy some bread as they had no ovens in which to bake their own.

Remember that potatoes only came to Britain in the 17th century and were, for a long time, food for the rich, swedes and turnips only came in the 18th century, and rice was an imported luxury. Only oatmeal was a realistic alternative, being a quarter of the price of wheat, and oatmeal was easy to cook over an open fire as girdle cakes or as gruel or porridge.

The Government feared that riots would ensue if the poor were too hungry, so they changed the law and allowed larger profits to the baker. The Bakers considered baking a worth-while trade again and not a charitable excercise, so resumed their trade.

How could a baker sell a loaf weighing exactly, say, 9 lb 7 oz 11 drams? Dough got lighter during the baking process - but not consistently. It depended upon how much water he added, how absorbent his flour was that season, how much pea flour he added, how well his oven was made, which part of the oven that loaf had been in ... He had to cut a lump of dough weighing about 10 lb 10 oz 14 drams, to get a loaf of 9 lb 7 oz 11 drams to sell.

Using a quarter of wheat (= 247 lb brown flour, approximately), the baker had to adjust the recipe to suit the amount of gluten in the flour, the amount of bran left in, whether the wheat germ was left in, the temperature of the environment, the strength of the yeast and how long he wanted to leave the mixture before weighing the lumps of dough.

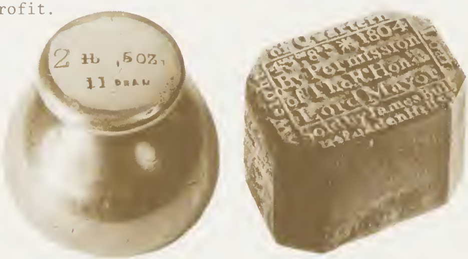
APPROXIMATE RECIPE FOR BREAD

120 lb flour 6 oz yeast 6 oz salt 65 lb warm water	made into a 'sponge', and kneaded twice over a twelve hour period.
127 lb flour 65 lb warm water 2 lb 10 oz salt	added to the sponge and kneaded twice more over a 1½ hour period.

This gives approximately 380 lb 6 oz of dough, which would be parted into about 35½ lumps weighing over 10 lb 10 oz each, to be baked for about 2 to 2½ hours in a well-heated oven.

If the baker calculated wrongly and his loaves were too light, he was punished, yet if he made the loaves a little heavy, to be sure he was within the law, he made no profit.

The knobbed brass weight of 2lb 5oz 11dr, is 2oz 15dr heavier than a half-quartern loaf, and was used to weigh dough before it was baked. The iron weight was also used by a baker, James Bull, in his shop, where the deep letters would be liable to clog up with dirt.



The authorities could identify who had made each loaf by the seal stamped on it, a copy of which was kept by each Alderman. The baker could put his seal on easily until the Law was changed in 1710. After that date, the baker had to mark the loaf with the weight, the price and the quality. The price was easy enough - I, VI, XVIII, and the quality was straightforward; F = finest white, W = wheaten, H = household, etc, but how did he put the weight on ? 4 oz 3 drams? 2 lb 5 oz 15 drams? 9 lb 7 oz 11 drams?

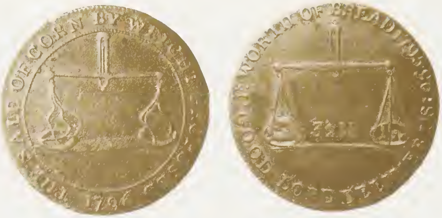
The 1710 law also specified the weighing of bread with avoirdupois weight, instead of the goldsmith's Troy weight, but in fact the change from Troy to Avoir was gradual, with a period until at least 1741, during which free bakers in towns made lighter loaves of Troy weight, whereas those bakers who lived ouside Guild control were to use Avoirdupois weight and make heavier loaves for the same price, thus reducing profits. The bakers in the towns were considered to have higher overheads, and higher taxes, but customers must have looked for an 'out-of-town' baker whenever possible.

Until 1757, dough was always divided up according to the price of wheat, so the customer never knew exactly what he would be getting for his money that week. No doubt he knew whether prices for wheat were going up or down, and expected his loaf consequently to be larger or smaller than last week's loaf. But, in 1757, the law was altered to allow bakers to make loaves the same size every week, and vary the price accordingly. If the local authorities agreed, all bakers in that area went over from Assized bread to 'Priced bread'. The baker weighed-out the same sizes every week, to produce the peck loaf = 17 lb 6 oz Avoirdupois, the half-peck = 8 lb 11 oz, the quartern loaf = 4 lb 5 oz 8 drams, and the half-quartern = 2 lb 2 oz 12 drams. These curious weights came about because, theoretically, a one-peck loaf was made from 1 peck of flour (2 gallons) plus the yeast, salt and water necessary to mix it. As different flours absorb different amounts of water, the resulting weight would, in practice, have varied, but the law said it was 17 lb 6 oz, so that is what the baker aimed for - and presumably the sensible baker did his best to obtain highly absorbent flour, to maximise his profits. Priced bread had the disadvantage that the baker had complicated sums to do with money, as the price of wheat fluctuated and he had to charge the customer 1s 2¼d or 9 3/4d, or whatever, but it had the advantage of his needing only one set of weights in the back of the bakery for weighing out his dough. This led to the manufacture of special bread weights for weighing out the dough and for checking the weight of bread sold.

The pricing of bread was accepted by the public when wheat was a reasonable price, but there were terrible wheat shortages in 1757, 1765, and 1767. The poor could not afford the asking price for the bread. They attacked wheat-carrying ships in harbour, barges on rivers, carts on highways, deliveries to mills, wheat going to markets - in fact, any wheat they heard about. Sometimes, they auctioned the wheat, or sold it at last year's price, and sometimes they stole it. The Government became increasingly nervous about the rioting.

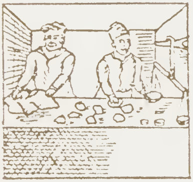
Until the wheat shortages, bakers had used approximately two thirds of the wheat to make into bread, and sold the bran separately as bedding for animals. But during the acute shortages, the Government instructed bakers to use three-quarters of the wheat to make bread, and the bakers 'helped' to alleviate the shortages by adding crushed bones, American ash, salts of ammonia, marble dust, alum, and other nasty contaminants. The law could do little about these additions, as chemical analysis was still primitive and nothing could be proved against the rogue bakers. The public could, however, feel the coarseness of the bread and were extremely resentful that they had to eat rough brown bread when they were accustomed, by the 1700s, to eating fine white bread.

There was another severe famine in 1794/5. The Government no longer feared mere rioting - they feared revolution. After all, France was only twenty-two miles away, and look what was happening there! Marie Antoinette was foolish enough to say "If they have no bread let them eat cake", but England's George III was not that much more intelligent. He begged the people to eat oatmeal and not to give it to their horses! Did he really believe that people would starve while their horses ate the oats? By 1801, a half peck loaf cost 3/10 - about a quarter or a third of a working man's wages went on enough bread to feed only himself. So what did his wife and children eat? And what was left for the rent?



Half-penny token. Obverse: 'The sale of corn by weight proposed 1796'. The empty scale has a box-end beam. Reverse: '1s worth of bread 1795·96 * Good Lord Deliver Us. 3½ lb' The loaf is being weighed with bell weights of 2lb & 1lb and a flat disc of 8oz.

Bakers suffered with the rest of the population. In years of famine, their customers bought so little bread that the bakers' incomes dropped as the price of flour rose, but in good years, bakers' incomes were more than adequate. They could support a family and still have surplus money, so they had tokens made for the public to use as small change (of which there was a national shortage). These tokens eased life especially for poorer people who wanted a 'farthing's worth' or a 'penny's worth', and tied the customer to the tradesman, who would redeem the tokens for goods or silver money when enough had been saved up. These tokens commonly had the name, address and trade on one side, and fascinating little pictures showing the types of scales and shapes of weights then in use.

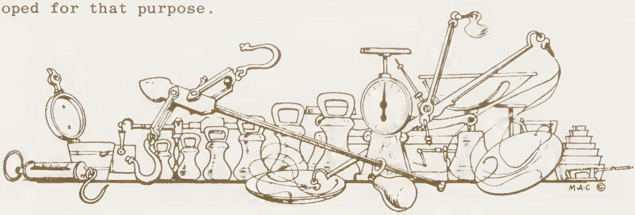


This woodcut 'Be just with thy weights; God plague false sleights' illustrated John Powell's 'Assize of Bread' written in 1592. The bracket out from the wall raised the scales about 38mm (1½") above the table to allow fast weighing of the dough. The weights shown are circular, flat and presumably made of lead.

'The Mysterie and Trade of Baking' and woodcuts are from The Modern Baker Confectioner and Caterer, Edited by John Kirkland, Gresham, London 1907.

The half-quartern weight is illustrated by courtesy of Lou uit den Boogaard.

PART 2 of this article will deal with the weighing of bread in the 19th and early 20th centuries, and will illustrate many of the special scales developed for that purpose.



English Coin-Weights 7

NORMAN BIGGS

WEIGHTS FOR ENGLISH AND PORTUGUESE COINS 1735-1772

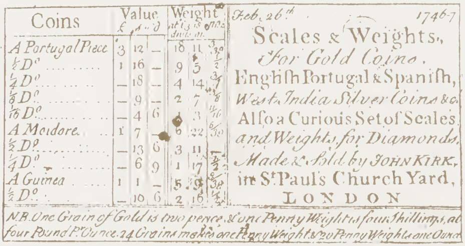
In 1703, England and Portugal signed the Methuen trade treaty. One consequence of it was that Portuguese gold coins began to circulate in England. The coins were known as moidores, and initially, they passed for 28s, but in 1714, Newton made his usual careful calculations and concluded that the value of a moidore, in relation to the guinea at 21s 6d, was not much more than 27s 6d. This value was enforced by an order from the Treasury, and provoked bitter protests from traders in the West Country (31). But Newton was unmoved, maintaining his strict adherence to the policy of correct relative values. The crowning achievement of that policy was the reduction of the guinea to 21s in 1717, and it appears that the moidore was reduced to 27s at the same time, although there is no explicit proclamation to that effect.

For some years after 1717, the guineas and the moidores together formed a stable and acceptable currency, and the use of coin-weights was not necessary. Consequently, there are, as far as we know, no weights bearing the portrait of George I (1714-29). However, one flaw remained in the administration of the gold coinage: the lack of a policy for the continual withdrawal of coins made light by natural or unnatural wear. Indeed, it was not until 1733 that the old hammered gold coins minted before 1663 were finally demonetised, and, according to Craig (6, p.240), some very ancient pieces were redeemed at that time. Among the coins remaining current, the guineas made in the early years of Charles II must have been distinctly worn, and consequently Gresham's Law was beginning to operate. The older, worn, guineas and the foreign coins were used in commerce, while the new guineas produced by the Mint were either hoarded or exported. Thus, it is no surprise to find that a new group of coin-weights began to appear in the reign of George II (1729-60).

The earliest guinea weights of this period resemble closely the guinea weights of the Newtonian period. There are two types with the old reverse of a crown superimposed on crossed sceptres, above the legend I GUINEA W. One of them has a large clumsy portrait of George II on the obverse - this type is extremely scarce; the other has a more pleasing portrait, Fig 1, and is not quite so scarce. A more common type has a portrait in high relief and occurs with two different reverses: either a crown (with the points of the sceptres remaining, but no trace of the sceptre-handles) above the usual legend, Fig 2, or just the legend alone in larger letters (Part 2, Fig 15). There are similar half-guinea weights corresponding to most of these guinea types. I classify them as 'official' types, although there is no firm evidence that they were made by authority.

There is a parallel subgroup of weights for the moidore. They have a 'dumpy' appearance and on the obverse they bear the Portuguese cross with decorations in the angles, while the reverse has the legend I MOIDOR W. There are at least four different kinds of decoration on the obverse, Figs 3 - 6, which may indicate four different makers. Of course, there are similar weights for the half-moidore and quarter-moidore. The size and style of this subgroup of moidore weights distinguishes them from later types, and places them alongside the 'official' guinea weights described above. It is impossible to date them exactly, but the period 1735 to 1745 seems the most likely.

By this time, the Portuguese gold coins had almost supplanted guineas in some parts of the country. The situation was complicated by the fact that, in addition to the moidore and its fractions, another series of Portuguese gold coins had been minted since 1722, and these coins also had begun to circulate in England. There were five new coins in all, valued at £3 12s, 36s, 18s, 9s, and 4s 6d. They were commonly known as a 'Portugal piece' (£3 12s) and fractions thereof; the name 'johannes' was also used (for the 36s piece) because these coins all carried the portrait and latin titles of John V of Portugal (30). So, we find a total of ten gold coins in common use in England during the later 1740s, as listed in the Table below. (The quarter-guinea was first issued on a very limited scale in 1718, but weights for it do not occur in the sets of George II guinea weights. All weights for the quarter-guinea date from after the second issue of this coin in 1762).



Coins	Value			Weight		
	£	s	d	[illegible]		
A Portugal Piece	3	12	—	18	11	3/32
½ D°	1	16	—	9	5	1/2
¼ D°	—	18	—	4	14	3/4
⅛ D°	—	9	—	2	7	3/8
1/16 D°	—	4	6	1	3	11/16
A Moidore	1	7	—	6	22	6/32
½ D°	—	13	6	3	11	—
¼ D°	—	6	9	1	17	1/2
A Guinea	1	1	—	5	9	9/32
½ D°	—	10	6	2	16	1/4

Feb. 26th 1746-7

Scales & Weights,
For Gold Coins.
English Portugal & Spanish,
West India Silver Coins &c.
Alſo a Curious Set of Scales
and Weights, for Diamonds,
Made & Sold by JOHN KIRK,
in St. Paul's Church Yard,
LONDON

N.B. One Grain of Gold is two pence, & one Penny Weight is four Shillings, at four Pound P. Ounce. 24 Grains makes one Penny Weight & 20 Penny Weights one Ounce

FIG A. Label from a box of money scales made or sold by John Kirk, London.

Sets of weight for the ten coins were made by John Kirk, a skilled engraver who produced commemorative medals as well as weights, at his premises in St.Paul's Churchyard. (One of his scale-box labels is shown in Fig A.) His earliest weights were beautifully executed pieces in copper, some of them bearing the dates 1746 and 1747, Figs 7,8,9. Apparently, he tried to make all the weights (except the 4s 6d one) with approximately the same diameter, but this resulted in a £3 12s weight which was about 8mm thick and presumably difficult to manufacture accurately, Fig 10. Perhaps it was for this reason that Kirk soon turned to a different design, using larger flans for the larger weights, Figs 11, 12, 13. Most of these weights are in brass, although there are a few examples in copper. When Joseph I succeeded John V, in 1750, his portrait was used on Kirk's weights for the johannes series, Fig 14. Later still, Kirk produced plainer weights using the reverse type of the earlier weights for both obverse and reverse, Fig 15. He also made weights for other foreign coins, such as the Spanish double doubloon, (Part 1, Fig 15).

Although John Kirk's weights stand out for their design and workmanship, other makers also siezed the opportunity to meet public need for coin-weights. Most of these sets contain weights for the quarter-guinea, and so must be dated after 1762. On the other hand, as will be explained in due course, few were made after 1772. Here, for the first time, we find provincial makers, mainly in Birmingham, the new centre for small brass-working trades. Some sets (probably the earlier ones) are quite ornate, with the aspirations, but not the artistry, of Kirk's weights. In several cases the £3 12s weight, alone, carries the maker's name, for example in the sets by Owen, Fig 16, and Ford, Fig 17, both Birmingham makers. By contrast, there is a fairly common set, Fig 18, in which all the weights bear the initials CW, probably referring to Callingwood Ward, another Birmingham maker of scales and weights. Other makers whose names have been recorded are: James Jackson, Anderton Son & Calley (Part 1, Fig 17), and Basil Hunt (29, p.1818), all of Birmingham; C.& L.Proctor, of Sheffield; J.Gardner, of Edinburgh; and Cowcher & Co. of London. The later examples of such sets of eleven weights are very plain, usually bearing only the value of the corresponding coin - for example, a moidore weight has the letter S above the number 27. However, each set has its own distinctive style of lettering and it is often possible to identify sets even in the plainest

ENGLISH AND PORTUGUESE COINS CURRENT 1740 - 1770

English Name	Portuguese name	Value	Weight		
Portugal piece or Double johannes	8 escudos	£3 12s	18 dwt	10 gr	= 442gr
Johannes	4 escudos	36s	9	5	221
Moidore	moeda	27s	6	22	166
Guinea	--	21s	5	9	129
Half moidore	½ moeda	13s 6d	3	11	83
Half guinea	--	10s 6d	2	16½	64½
Quarter johannes	escudo	9s	2	7¼	55¼
Quarter moidore	quartinho	6s 9d	1	17	41½
Quarter guinea	--	5s 3d	1	8¼	32¼
Eighth johannes	½ escudo	4s 6d	1	3½	27½

NOTES 1. The name 'dobra' is sometimes used for any one of the 2, 4, and 8 escudo pieces.

2 Various figures are given for the weights of the portuguese pieces, on the weights themselves and on scale-box labels. The weights quoted here are the most common.

cases, Figs 19, 20. In our classification scheme an attempt is made to arrange these sets in several subgroups for easy reference. The plainest of all are probably those where the value is stamped incuse on a flat brass disc, Fig 21.

Unfortunately, although individual weights from the sets of eleven are quite common, it is unusual for a collector to find more than three or four pieces from the same set together. This difficulty is exacerbated by the classification system used by most museums, which purposely splits up the weights from a set. Usually, one finds all the £3 12s weights in one tray of a museum collection, followed by the 36s in another tray, and so on. If one is lucky, the moidore weights may be in the same section, but it is almost certain that the guinea weights will be an entirely different section of the collection.

The glut of coin-weights dating from the 1760s, is indicative of the poor state of the gold currency at that time. The production of good guineas at the Mint continued, but it was ineffective because all the new guineas were exported. A classic quotation from Adam Smith's 'Wealth of Nations', likens the Mint to Penelope, whose labours by day were undone nightly. In such circumstances, it is hardly surprising that counterfeiting was rife. It is instructive to note that the infamous Yorkshire Coiners (28) operated by filing down good guineas (for which they paid a premium) and using the gold so obtained to make counterfeit Portuguese pieces. Clearly, such practices could not be allowed to continue. In the next part of this series it will be explained how the authorities acted to remedy the situation, and how an entirely new group of coin-weights was created in consequence.

CLASSIFICATION

All the weights described in this Part belong to a single group. Since there are numerous varieties of the later weights, the division into subgroups is chosen for the convenience of recognition, rather than for historical reasons.

GROUP H	Weights for English and Portuguese Coins (and a few other coins), issued from about 1735 to 1772.
Subgroup H1	George II guinea weights, 'official' types.
Subgroup H2	Moidore weights, 'dumpy' types.
Subgroup H3	Weights by John Kirk, or presumably by him.
Subgroup H4	Sets of eleven weights, decorated and/or named.
Subgroup H5	Sets of eleven weights, plain types with LSD in script letters.
Subgroup H6	Sets of eleven weights, plain types with LSD in Roman letters.
Subgroup H7	Sets of eleven weights, plain types with value stamped incuse.

ILLUSTRATIONS

1. Obv. portrait of George II, GEORGIUS·II REX. Rev. crown on crossed sceptres, 1 GUINEA W. 128½gr, 21mm, c.1740. For the guinea 129 gr valued at 21s after 1717.

2. Obv. portrait of George II, GEORGIUS·II REX. Rev. crown, sceptre points but no handles, 1 GUINEA W. 129½gr. 20mm, c.1740. For the guinea, as 1.

3. Portuguese cross with raised dot in centre, ornaments in angles radiating diagonally. Rev. ½ MOIDORE W. 83gr, 18mm, c.1740. For the Portuguese half-moidore, 83gr, 13s 6d.

4. Obv. Portuguese cross, no dot in centre, cross-and-crosslets in angles. Rev. ½ MOIDOR W. 83gr, 18mm, c.1740. For the half-moidore, as No.3.

5. Obv. Portuguese cross, no dot in centre, four-leaved ornaments parallel to the cross in angles. Rev. ½ MOIDOR W. 83gr, 18mm, c.1740. For the half-moidore, as No. 3.

6. Obv. Portuguese cross, dot in centre, four-leaved ornaments diagonal to the cross in angles. Rev. ½ MOIDOR W. 83gr, 18mm, c.1740. For the half-moidore, as No. 3.

7. Obv. portrait of George II, I.K. below, GEORGIUS II REX. Rev. ONE GUINEA WEIGHT. 129gr, 21mm, in copper, c.1746. For the guinea, as No.1.

8. Obv. Portuguese cross, square ornaments diagonally in angles, *IN*HOC* SIGNO*VINCES*1747 (floral stops). Rev. ONE MOIDORE WEIGHT. 165gr, 22mm, in copper, 1747. For the Portuguese moidore, 166gr, 27s.

9. Obv. portrait of John V, 1746 below, IONNES·V·PORT·REX. Rev. A PORTUGAL PIECE OF EIGHTEEN SHILLINGS. 110gr, 22mm, in copper, 1746. For the Portuguese 2 escudo piece, 110½gr, 18s.

10. Obv. as No.9. Rev. A THREE POUND TWELVE. 441gr, 24mm, in copper, 1746. For the Portuguese 8 excudo piece, 442gr, £3 12s.

11. Obv. portrait of George II, I·KIRK·F below, GEORGIUS·II·DEI·GRATIA. Rev. crown over shield with words A GUINEA, M·B·F·ET·H·REX·F·D·B·ET· L·D·S·R·L·A·T·ET·E 1748. 129gr, 26mm, 1748. For the guinea, as No.1.

12. Obv. Portuguese cross with square ornaments diagonally in angles, IN·HOC·SIGNO·VINCES 1748. Rev. A MOIDORE, decorations around. 165gr, 27mm, 1748. For the moidore, as No.8.

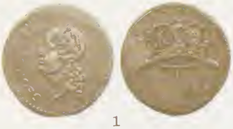
All the following pieces are for the 8 escudo piece, as No. 10.

13. Obv. portrait of John V, KIRK 1747 below, IONNES V·D·G·PORT·ET·ALG·REX. Rev. crown and decorations, THREE POUND TWELVE. 442gr, 28mm, 1747.

14. Obv. portrait of Joseph I, KIRK below, IOSEPHUS·I·D·G·PORT·REX. Rev. similar to No.13, but minor differences in design. 441gr, 29mm, c.1750.

15. Obv & Rev. similar to reverses of Nos. 13 & 14, but with minor differences 442gr, 29mm, c.1760.

16. Obv. OWEN BIRMINGHAM with decorations. Rev. similar to Nos. 13, 14, 15, but in cruder style. 440gr, 30mm, c.1760.



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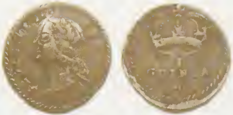

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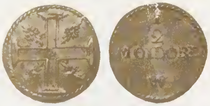

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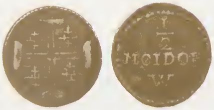

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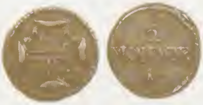

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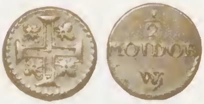

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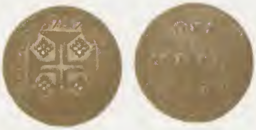

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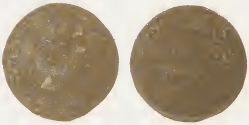

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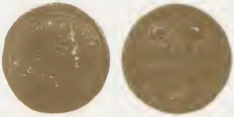

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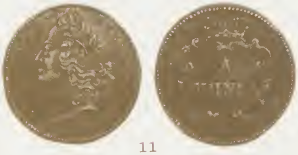

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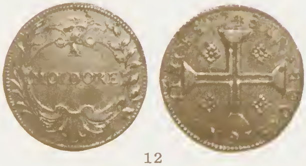

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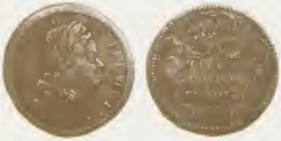

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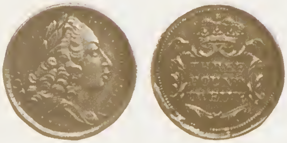

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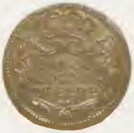

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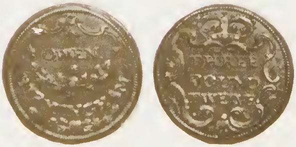

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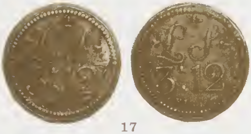
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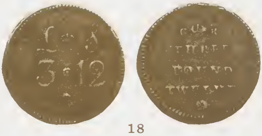
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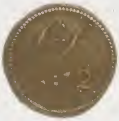
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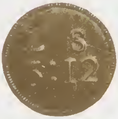
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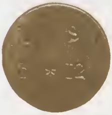

21

17. Obv. script L S over 3 12, crown over, clover leaves, FORD below. Rev. similar, but BIR^{m} replaces FORD. 442gr, 29mm, c.1760.
18. Obv. script L S crown between, 3 12 rose between, small crown over CW below. Rev. G R crown between, THREE POUND TWELVE, rose below. 440gr, 30mm, c.1760.
19. Obv & Rev. Script L S intertwined, 3:12. 444gr, 28mm, c.1760.
20. Obv & Rev. Roman L S, 3:12. 441gr, 28mm, c.1760.
21. Obv & Rev. incuse lettering, Roman L S, 3*12 star between. 444gr, 27mm, c.1760.

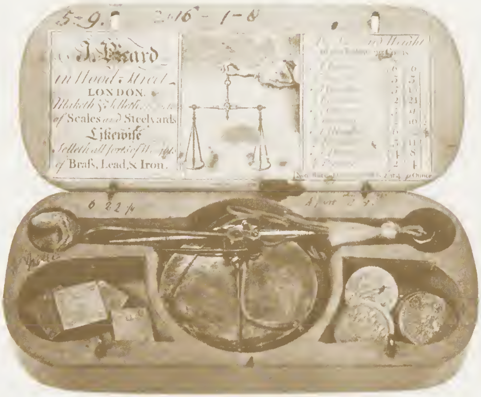
REFERENCES

References 1 - 27 are given in earlier parts.

28 LING ROTH H.: 'The Yorkshire Coiners' Halifax 1906.
29 MALLIS A.G.: 'English Coin Weights for Portuguese Coins Current in England' The Numismatist, Vol 91 1978 pp1797-1820.
30 SNELLING T.: 'A View of the Coins Current at this time throughout Europe' London, 1766.
31 HALL A.R. & L.TILLING (Eds) 'The Correspondence of Isaac Newton' Vol 6. CUP Cambridge, 1976.

History in a Box

MICHAEL CRAWFORTH



The fascination of collecting scales and weights goes well beyond mere possession and enjoyment of physical objects. Thoughtful examination of the objects can provide intriguing evidence of the every-day lives of our forefathers. Most scales and weights are a record of history, showing how our ancestors used weighing for many different purposes through changing periods and circumstances. The record may take various forms, but a particularly rich source is found in some sets of money scales.

The set of money scales illustrated here bears the label "J. PICARD in Wood Street, London. Maketh & Selleth all sorts of Scales and Steelyards. Likewise Selleth all sorts of Weights of Brass, Lead & Iron." In the centre, is a picture of a hand holding a scale. Such a picture was usually a representation of the sign which hung outside the maker's shop to attract customers, and which was readily recognised by those who could not read. 'The Hand and Scales' was commonly used by scalemakers. The choice of wording on the label suggests that Picard made and sold scales and steelyards but only retailed weights.

On the right of the label, is a table of coin weights for the jacobus, carolus, guinea, moidore and pistole. The moidore was a Portuguese gold coin which circulated in England for many years following the Methuen trade treaty of 1703. The jacobus and carolus were the old gold pieces coined in the reigns of James I (1603-1625) and Charles I (1625-1640), which still circulated in small numbers in the first quarter of the eighteenth century. Although revenue officials and banks refused to accept these old worn coins in the early 1700s, it was not until 1733 that the coins were officially demonetised. The pistole came from France and was used in England during the late seventeenth and early eighteenth centuries. So, it is likely that Picard's label was designed and printed some time before the demonetisation, and the inclusion of the pistole, rather than the Portugal piece, suggests that it dates from the period 1710 to 1730.

Included among the weights still in the box, is a weight with the bust of James II (1685-1689) which has been filed flat on the reverse and stamped 21s, (i.e. the guinea of 129 grains). This weight probably started life for the old jacobus of James I (155 grains) but was subsequently reduced to the weight of the more modern guinea. Also included are weights for the pistole and half-pistole of Louis XIV of France, and a weight for the half-guinea of George II (1727-1760). This last weight might well indicate the date of the set as c.1727.

Written in ink on the outside of the box, is 0/0 which was probably the shopkeeper's price code, based on some mnemonic such as 'God be with us', each letter representing a number 1 to 11. Thus, using the above example, 0/0 would be 2 shillings and 2 pence, (in another example, b/u would be 4s 10d). Although this price seems reasonable for the period, there were many different mnemonics, and the code on the box cannot be deciphered without knowledge of which one was used by Picard.

Inside the box is written an owner's name, "W. Neale", and written in a similar hand, near the left hinge, is the number "6 22¼" - the weight of a moidore. Does this mean that Mr.Neale frequently handled moidores and did not want to waste time finding the weight in the table?

Next to the other hinge, another owner has written "A Port 18dw 8½gr" A Port was a Portugal-piece which, when it was full weight was 18 pennyweights 12 grains, and worth £3 12s. However, as gold coins were soon worn by continual circulation, it was common practice to accept a certain amount of loss in weight without loss of value. So, this owner was prepared to take a coin of 3½ grains underweight (a loss of 7d worth of gold), at the full value. His hand-written note was probably written when the Portugal-piece was in wide circulation in England, in the 1740s and 1750s.

Yet another owner has written, above the label, "5.9, 2.16, 1.8", the weights in pennyweights and grains of the guinea, half-guinea and quarter-guinea. The quarter-guinea was effectively coined in 1762, so this ink annotation was made after that event, and may have been stimulated by the New Standard of 1774, as the weights 2.16 and 1.8 refer to the least current weights announced at that time, for recently minted coins. Two more weights in the box relate to that period, a 5P.8G and a 2P.16G, both stamped with the official crown of the Office of Stamper of Money Weights, a department of the Royal Mint. (P was one of the contemporary abbreviations for pennyweight, and G stood for grains). Also dating from this period are the two sheet brass weights for 6 and three grains, each stamped with the official crown.

In the other weight pen is a part-set of pennyweights, 6,5,4,3,2, stamped with a lion passant-guardant, supposedly the mark of the Goldsmiths' guild. These weights suggest that the owner at that time wanted to weigh a greater variety of coins than he could carry individual weights for, and was prepared to weigh them the slow way. There were ten gold coins circulating in England in the mid-eighteenth century, (eleven after 1762), and international traders had to deal with many more.

How does all this evidence relate to what is know about the maker of the scales? John Picard was born around 1684, the son of a gentleman, Joseph Picard of Cowley. There were four villages in England with the name Cowley, and which of these was the home of the Picards' is not recorded. When John was 14, he was taken to London to learn a trade, for it is recorded in Blacksmiths' Apprentice Rolls for 1698 that he was bound to a famous scale-maker, John Snart, whose shop was next to Goldsmiths' Hall in Maiden Lane, London (now part of Gresham St.). Apprenticeship was usually for seven years, and John Picard finished his apprenticeship and was made a freeman of Blacksmiths' Company (guild) in February 1705. In that same month he took the Freedom of the City of London, a necessary step if he was to trade legally within the City boundaries. With his business duly started, he took his first apprentice in 1708, and over the following thirty years he taught scalemaking to fourteen boys, some of whom became important master scale-makers in their own right (Joseph Sommers, William and James Sangster, and Thomas Brooksby). John's apprentices included his son, Joseph, who was formally bound to his father in 1727, but Joseph's name is not mentioned again in Blacksmiths' records, so we do not know if he continued to work for his father, or turned to some other occupation.

A sign that John Picard's business was flourishing came when he was admitted to the Livery of Blacksmiths' Company, in 1711. The Livery was a wealthy elite within the guild from whom future officers were chosen, and the first step in the hierarchical ladder was to be elected Steward for Lord Mayor's Day. Stewardship involved organising, for Blacksmiths' Company, the huge stand, awnings, bunting and flags with which each guild lined the streets of London so that privileged members of their guild could see the pageantry and spectacle of the Lord Mayor's annual procession on the day of his election. Some men with social ambitions were pleased to be elected Steward, but most accepted with some reluctance because, in addition to the onerous duties, the Steward had to make a personal contribution of £8 towards the cost of the event. This may not seem a large sum, but at that time, a skilled workman recieved a weekly wage of 10 shillings, so the equivalent of £8 today would be well over £2,000 !

On 6 October 1726, John Picard was elected Steward for Lord Mayor's Day. A few days later he came before the Court of Assistants, the ruling body of the Guild, to discuss his appointment. But it proved to be a very different interview from the one the Court expected. They were so shocked by his strange behaviour and abusive language that they took the unprecedented step of cancelling his appointment as Steward. It seems that poor John Picard was already showing signs of the deteriorating mental health which was later to ruin his life. In 1735 his condition was so extreme that he was admitted to Bethlem Hospital for the insane, colloquially known as 'Bedlam', and Ann, his wife, was left to run the business and look after the apprentices. Hospital records show that he was discharged in 1737, but no further mention of him occurs in the records of Blacksmiths' Company.

Thus, many parts of this set reveal a fascinating story - but the observer must judge whether the weights are original, or whether they were added much later, not for use, but to make a 'nice-looking' item for sale or for collection! The contents of this set fit so well with the historical clues that I am inclined to think they are original and show the continued use of the scales through changing periods of history for over half a century.

REFERENCES

Blacksmiths' Company: Binding Books, MS 2886/3-5
: Court Minutes, MS 2881/10-12

CRAWFORTH M.A.: Scientific Instrument Makers in the London Guilds. Annals of Science 44, London 1987.

CRAWFORTH M.A.: Weighing Coins - English folding gold balances of the 18th and 19th centuries. London 1979.

Showcase

1. Roberval counter scales marked 'J.White & Son Auchtermuchty' (a town in Scotland) and 'To Weigh 2 lb Class 2'.

BILL MAY COLLECTION

2. Three American grain testing steelyards by the Howe Scale Co. Sizes 1 quart, 2 quart, and 1 pint. The beams are shown standing in the grain buckets for the photograph.

JOHN CATTLE COLLECTION

3 & 4. Weight-collecting postal scale of American manufacture. Graduated 0 to 8 ounces, with various postage rates. Cast iron base. The steelyard weight was put on the letter plate to show the collection of weights which run in slots behind the dial face, Fig 3.

BILL LINDEYER COLLECTION

5. Pendulum letter balance marked 'P.St.& Co' below the base (maker has not been identified). Graduated 0 - 5 oz. All brass.

MICHAEL CRAWFORTH COLLECTION

6 & 7. Cased, knobbed brass weights marked 30, 20, 10 and'5 sov s'. (see detail, Fig 6). They weigh, respectively, 3369, 2254, 1120 and 561.5 grams, showing that they were not for English coins.*

LOU UIT DEN BOOGAARD COLLECTION

**Lou would be pleased to have the coins identified and dated: Editor.*

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SHOWCASE

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Review

WEIGHTS AND MEASURES by J.T.Graham revised by M.Stevenson

A review of the first edition of this excellent booklet appeared in Equilibrium (p.226). The revised edition has rationalised the content, removed many errors and added some most useful data. For example, the addition of eight pages devoted to verification marks and district numbers is highly apposite and most welcome, as is the extensive revision of the chapter on 'Interesting Marks on Weights'. These additions were made possible by the removal of material about early weights of Middle Eastern origin, which is no great loss, as they could not be adequately covered in the small space available.

Regretably, a few errors still remain; for example, the use of 'drams' on apothecary weights was NOT a mistake in the 19th century (p.3) the reservation of this spelling for the avoirdupois system is a 20th century development; small bell weights with different designs of handle sometimes

WERE originally supplied (p.4) and were even shown in maker's catalogues (see EQM p.732); the iron weight shown on the bottom left, p.8 is not c.1800 but was shown in maker's catalogues of the 1890s onwards; surely Ashanti weights were for *weighing* gold, not *made* of gold (p.22).

These few discrepancies do not affect the excellence of this little book with its smart new cover picture. It is first-class value for money and should be on every weight and scale collector's bookshelf. Owners of the first edition should get the second edition: Highly recommended.

Weights and Measures. by J.T.Graham, revised by M.Stevenson. Shire Publications Ltd, Aylesbury, England. 1987. 32 pages, 36 illustrations plus many verification marks. price as for Scales & Balances, below.

SCALES AND BALANCES by J.T.Graham revised by A.W.Garratt

The original edition of this excellent little book was reviewed in Equilibrium (p.355). This revised edition has some of the inaccuracies removed and some new information added. The more detailed descriptions of the waggon steelyard and of various spring balances, for example, are particularly welcome. The booklet still briefly covers British scales of interest to most collectors: coin, postal, precision, inspector's, bank, yarn, trade, bread and apothecary scales; and includes all the major mechanical types.

It is a pity that the revision did not eliminate more of the errors. For example; pendulum balances were used long before the postal scales of the 1840s, by Ludlam 1758, Clais 1772, Hahn 1780, and many others (p.3)(see the article, EQM p.602); there is still no mention of scruples in apothecary sets (p.8); the yarn balance shown (p.13) was invented in Germany (and patented by Staub), not in the "North of England"; Candlestick balances by R.W.Winfield came from the period 1840-60, not 1880 (p27); Salter was not the first to use dial-face spring balances, Hanin of Paris made them in the 1790s (p.31); and it is sad to see that the inverted roberval scale is still being given a birth date in the late 19th century (p.22) when proof was presented in Equilibrium (p.132) of its use already being established in 1828.

These quibbles only affect a very small percentage of the booklet, which remains excellent value for money, and an essential part of a collector's library. Highly recommended, and at this price, every owner of the first edition can afford to buy the second edition.

Scales and Balances. by J.T.Graham, revised by A.W.Garratt. Shire Publications Ltd, Aylesbury, England. 1987. 32 pages, 39 illustrations, price £1.25 plus p & p. or £2.00 from ISASC (£3.00 by air) post included.

THE WEIGHTS AND MEASURES OF ENGLAND

by R.D.Connor.

Professor Connor shows his enthusiasm for the roots of the subject by dealing very thoroughly with body measures, Greek and Roman weights, measures and coinage, and Romano-British, Celtic, and Saxon weights, measures and coinage. This section takes up a third of the text. The middle part is a well-argued discussion of commercial weights and measures, with their ambiguities and anomalies, 33 pages on the Assize of Bread and Ale, and a detailed analysis of the Victorian attempts to make accurate and compatible standards. The final part is concerned with metrication up to 1986. As an appendix, he quotes in full some of the Early Acts of Parliament which are difficult to obtain in libraries, and a further appendix covers regulation and enforcement.

This is a very readable, yet scholarly, book, concentrating particularly on fascinating quotations (translated into modern English) from contemporary sources - Court proceedings, Acts of Parliament not previously written about, books of instruction, letters, and diaries - all of which animate and enliven the book. His enquiring mind has lead him into non-English and non-metrological subjects which put the English material into its historical and international setting. The documentary sources dominate the book, showing clearly the anomalies and inconsistencies in the English approach to controls and inspection, and showing the conservatism of the English in continuing to use their local measures long after they were made illegal. Because of the emphasis on documentary sources, and his lack of discussion of the vast array of weights and measures which has survived, the reader gets a very one-sided view of the subject. One gets the impression that virtually the only objects to survive are official standards, and that those are mainly in the Science museum in London! The photographs reinforce this impresssion - of the 58 illustrations, 23 are of non-English subjects, and nearly all have been used repeatedly in other books, or in 'Libra' magazine. How much more interesting it would have been to see 58 unpublished English weights and measures.

The author omits some of the Guilds who had the right to inspect weights and measures - Clockmakers', Blacksmiths', Grocers' and Goldsmiths' Companies - but basically, the use of original sources is excellent, illuminating and satisfying, so this book enlarges our knowledge of a much neglected subject. It will not help in identifying any weights or measures, but it is highly recommended as essential background reading.

The Weights and Measures of England: By R.D.Connor. HMSO, London 1987. ISBN 0-11-290435-1. 421 pages, 58 illustrations, hardback. Price £30 + p & p.

A DICTIONARY OF WEIGHTS AND MEASURES FOR THE BRITISH ISLES: THE MIDDLE AGES TO THE TWENTIETH CENTURY

by Ronald E.Zupko

Dr. Zupko's dictionary is intended to bring order to the confused history and proliferation of British weights and measures, for the benefit of *economic historians*. The author quotes, in most cases, the Oxford English

Dictionary etymology, followed by a chronological list of contemporary references to illustrate the often varied meaning of the terms, and draws attention to the great variety of spelling. He appends a bibliography, impressive in its size, to which he occasionally adds a comment on the content or usefulness of the work cited.

There is no doubt that this dictionary represents a tremendous amount of research, and is successful in showing the great variety of units used in the British Isles, and it draws a fascinating picture of the changing meaning of the terms according to place, time, or application. Many obscure terms are included, like furendal, goad, hobed, lippy, llestraid, peget, perit, raff or stimpart, as well as the common pound, foot, acre or pint. The alternative names are well cross-referenced, but occasional slips occur such that 'trone weight' can only be found under 'pound', 'claw' under 'clove', and so on.

In a dictionary of this type, the reader expects a comprehensive list. The reviewer checked two references, Halliwell's Dictionary of Archaic and Provincial Words, and Libra, but, out of 95 obscure terms chosen, 36 were not included by Zupko. Waxpunde, ledpund, assay ton, ken, trug, inch weight, and many other obscure terms are omitted. If gross weight is worthy of inclusion, why not nett weight? If bismar, auncel and pundlar are included, why are stilliard and tumbrel omitted?

In general, the references to weights and measures seem accurate, but the definition of auncel relies on the dubious O.E.D. 'lancella' derivation, although it is now generally accepted that the auncel was a bismar type of instrument, not a steelyard.

The first impression of this book is of a massive volume of 520 pages nearly two inches thick (50mm), but this is due to double-spacing of the computer text, a feature which makes smooth reading difficult. In the copy reviewed, eight pages were badly bound, two of them with the last letters clipped on each line of text. In the bibliography, eighteen authors are mis-indexed under their first name, so one wonders how many other errors have been overlooked at the proof-reading stage.

In spite of its shortcomings, this is the only dictionary which draws together so many obscure terms and which will help historians and metrologists alike, to trace and understand them in their contemporary context. It would not help the collector or keeper of artifacts to identify an old weight or measure.

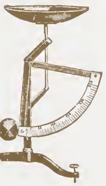
A Dictionary of Weights and Measures for the British Isles: The Middle Ages to the Twentieth Century. By Ronald E. Zupko, American Philosophical Society, Philadelphia, 1985. ISBN 0-87169-168-X. Hardback, 520 pages. Price $30 USA. plus P & P.

Your display space - is SHOWCASE!

Old Advert

Illustrations from the 1933 catalogue of Gottlieb Kern & Sohn, Ebingen, Germany.
'Chemical and Parcel Scales'

Chemikalien- und Paketwaagen

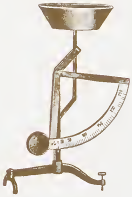


Nr. 837

Nr. 837

Chemikalienwaage, mit matt gebeizten Messingteilen und schwarz emailliertem Eisenfuß. Mit abnehmbarer Schale.

Tragkraft	50	100	250	g
Skalateilung	1	1	5	g
a Mit Celluloidschale	**1.95**	**2.70**	**3.75**	RM.
b Mit Glasschale . .	**2.10**	**3.60**	**8.25**	RM.

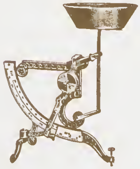


Nr. 839

Nr. 839

Chemikalienwaage, aus Messing matt gebeizt, mit schwarz emailliertem Eisenfuß und abnehmbarer Messingschale.

Tragkraft . .	50	100	250	500	1000	g
Skalateilung	1	1	5	5	10	g
Preis . . .	**1.50**	**2.10**	**2.70**	**4.05**	**4.95**	RM.

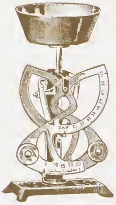


Nr. 841

Nr. 841

Chemikalienwaage, mit Umschaltung und zwei Teilungen, aus Messing gebeizt mit schwarz emailliertem Gestell, sowie abnehmbarer Messingschale. Neue verbesserte Ausführung mit schräger Emailskala und wagrecht angebrachten Zahlen zum bequemen Ablesen.

Tragkraft	250/50	500/100	1000/250	2000/500	g
Obere Skala	1	1	1	1	g
Untere Skala	5	5	5	10	g
Preis . .	**4.65**	**6.—**	**8.85**	**13.20**	RM.

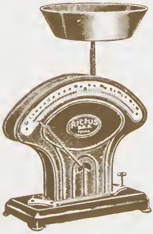


Nr. 843

Nr. 843

Chemikalienwaage, aus Messing gebeizt mit schwarz emailliertem Gestell, sowie abnehmbarer tiefer Messingschale.

Tragkraft	100	250/60	500/100	1000/250	g
Untere Skala	1	1	1	5	g
Obere Skala	1	5	5	10	g
Preis . . .	**3.75**	**4.65**	**6.90**	**10.50**	RM.

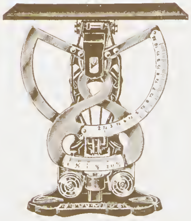


Nr. 845

Nr. 845

Chemikalienwaage, aus Messing matt gebeizt, auf schwarz lackiertem Sockel. Mit abnehmbarer tiefer Messingschale, oder mit flachem Messingteller als Briefwaage.

Tragkraft	250	500	1000	g
Skala	in 1 g 0-50	in 1 g 0-100	in 5 g 0-200	
Skala	in 5 g 50-250	in 5 g 100-500	in 10 g 200-1000	
a Mit Schale	**6.—**	**9.—**	**16.05**	RM.
b Mit Teller	**5.40**	**8.40**	**15.45**	RM.



Nr. 847

Nr. 847

Paketwaage, Modell „Columbus“, aus Messing matt gebeizt. Eisengestell fein schwarz emailliert mit Goldfassung und Skalen vernickelt. Mit flacher Eisenplatte, oder mit gewölbter Metallschale als Wirtschaftswaage.

Tragkraft	6	10	kg
Untere Skalateilung in 25 g	bis 1 kg	bis 2	kg
Obere Skalateilung in 50 g	bis 6 kg	bis 10	kg
a Mit Eisenplatte . . .	**19.65**	**22.20**	RM.
b Mit Metallschale . . .	**19.65**	**22.20**	RM.